Notes on the African Agromyzidae (Diptera) - 6

by

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(Submitted through L. Vári, Transvaal Museum, Pretoria).

The majority of the material discussed here is from South Africa, collected mainly by B. R. and P. Stuckenberg but also in part by the author during a short visit in January, 1964. A few older specimens collected by R. E. Turner in South Africa and South West Africa between 1923 and 1938 have been studied.

Some interesting material is also considered from Rhodesia collected by the author in early February, 1964 and two species have been described from Kenya and the Cape Verde Islands. A total of 21 new species are described.

The opportunity has been taken to revise some of the author's earlier (1959) species. Genitalia studies have revealed a number of synonyms which are established below and illustrations of the ♂-genitalia of these species are included.

I would like to record here my thanks to my wife who has prepared all illustrations in this paper. The scale line of the genitalia drawings represents 0.1 mm.

References of earlier papers not included below will be found in my synopsis of Ethiopian Agromyzidae (1959).

Genus *AGROMYZA* Fallén, 1810

Agromyza abutilonis Spencer, 1959, figs. 1 and 2

NATAL: Pietermaritzburg, Town Bush, 18.X.1962, one ♂, B. and P. Stuckenberg.

The genitalia (slide 794) confirm the identity of this specimen and there is now no reasonable doubt that the female found at the same locality (Spencer, 1963a : 95) was correctly identified.

The aedeagus of the allotype from Kenya is shown in figs. 1 and 2.

Agromyza albipila Becker, 1908, figs. 3-6

CAPE PROVINCE: Mossel Bay, 20. and 31.X.1938, one ♂ and one ♀, R. E. Turner.

This is the first record of *albipila* outside the Canary Islands, where it has hitherto been accepted as endemic. The species is distinctive in having all bristles slightly yellowish and unusually long cerci (fig. 3).

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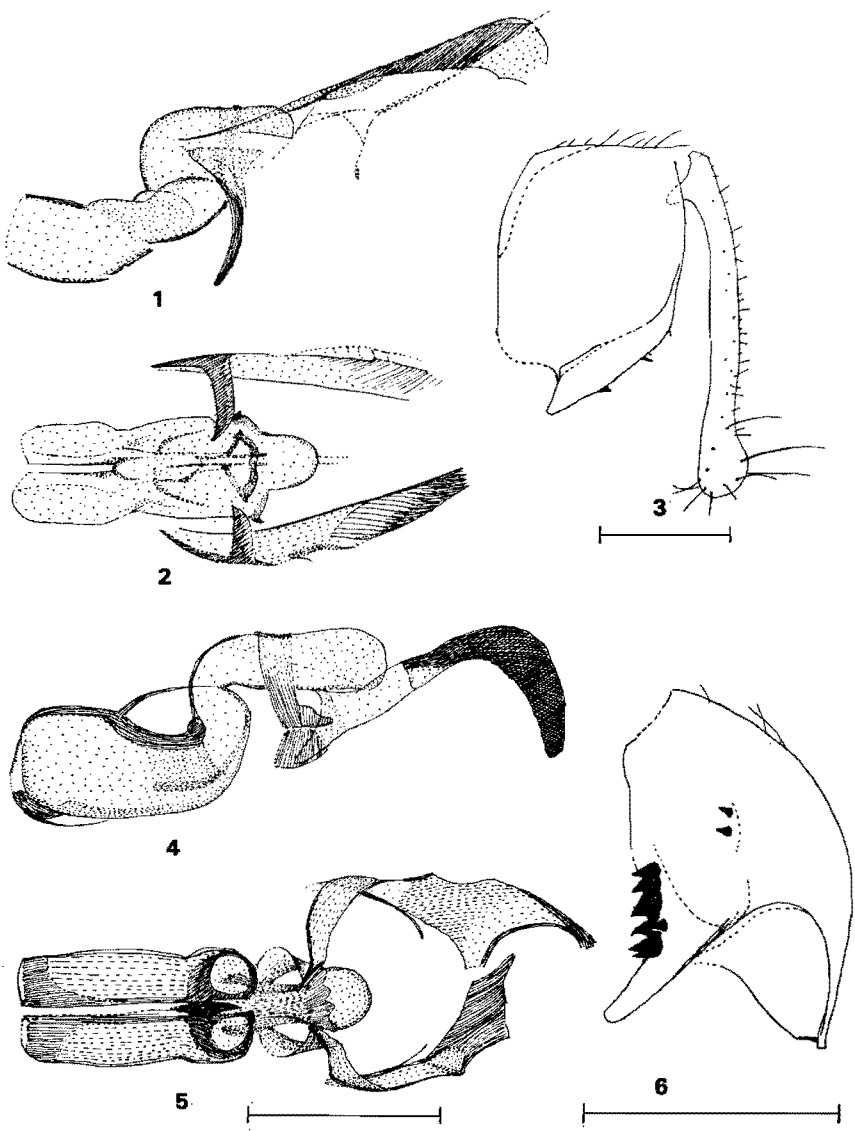

Figs. 1-2. *Agromyza abutilonis:* 1. aedeagus, side view; same, ventral view.
Figs. 3-6. *A. albipila:* 3, cerci; 4, aedeagus, side view; 5, same, ventral view; 6, surstylus.

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The aedeagus of the male from Mossel Bay is shown in figs. 4 and 5 and the distinctive surstyli in fig. 6. The aedeagus of a specimen from Tenerife was recently illustrated by Spencer (1965a: fig. 1).

A. albipila can be included in the author's (1959) key to African *Agromyza* species by adding a new couplet as follows: Couplet 4, first alternative for 5 read 5a; add new couplet:

5a Costa extending to vein m 1 + 2; all bristles obviously black; cerci normal . . . . **verdensis** Spencer

— Costa ending at vein r 4 + 5; all bristles at least slightly yellowish; cerci abnormally elongated . . . . . **albipila** Becker

Agromyza catherinae Spencer, 1959

NATAL: Ingwavuma Distr., Ndumu Reserve, 1-10.XII.1963, 23 ♂♂, five ♀♀, B. and P. Stuckenberg.

RHODESIA: Victoria Falls, 3.II.1964, one ♀, K.A.S.

All the above specimens were caught on or near large growths of Setaria chevalieri and at Victoria Falls empty mines similar to those recorded at Pietermaritzburg were common (Spencer, 1963a: 124). Two further puparia were obtained from the same host-plant at Pretoria, 19.I.64 (K.A.S.), but again no adults were reared. There now seems little doubt, however, that the mines on Setaria are caused by this species.

Agromyza ocularis Spencer, 1961

BASUTOLAND: Maseru Distr., Maloti Mts., Bushman's Pass, 2125-2250 m, 8-14.I.1963, one ♂, genitalia slide 904, B. and P. Stuckenberg.

This is only the third record of this local species.

Agromyza verdensis Spencer, 1959, figs. 7 and 8

The aedeagus of the holotype from S. Vincente, Cape Verde Islands, is shown in figs. 7 and 8.

A female from S. W. Africa: Okahandja, 10-16.II.1928, R. E. Turner, in the British Museum (Nat. Hist.) runs to this species in the author's (1959) key but the mesonotum is even more brilliantly shining black. There seems little doubt that it represents an undescribed species but its description should wait until further material is available.

Genus *OPHIOMYIA* Braschnikov, 1897

Ophiomyia beckeri (Hendel), 1923

CAPE PROVINCE: lower slopes of Table Mountain, and Banhoek Valley,

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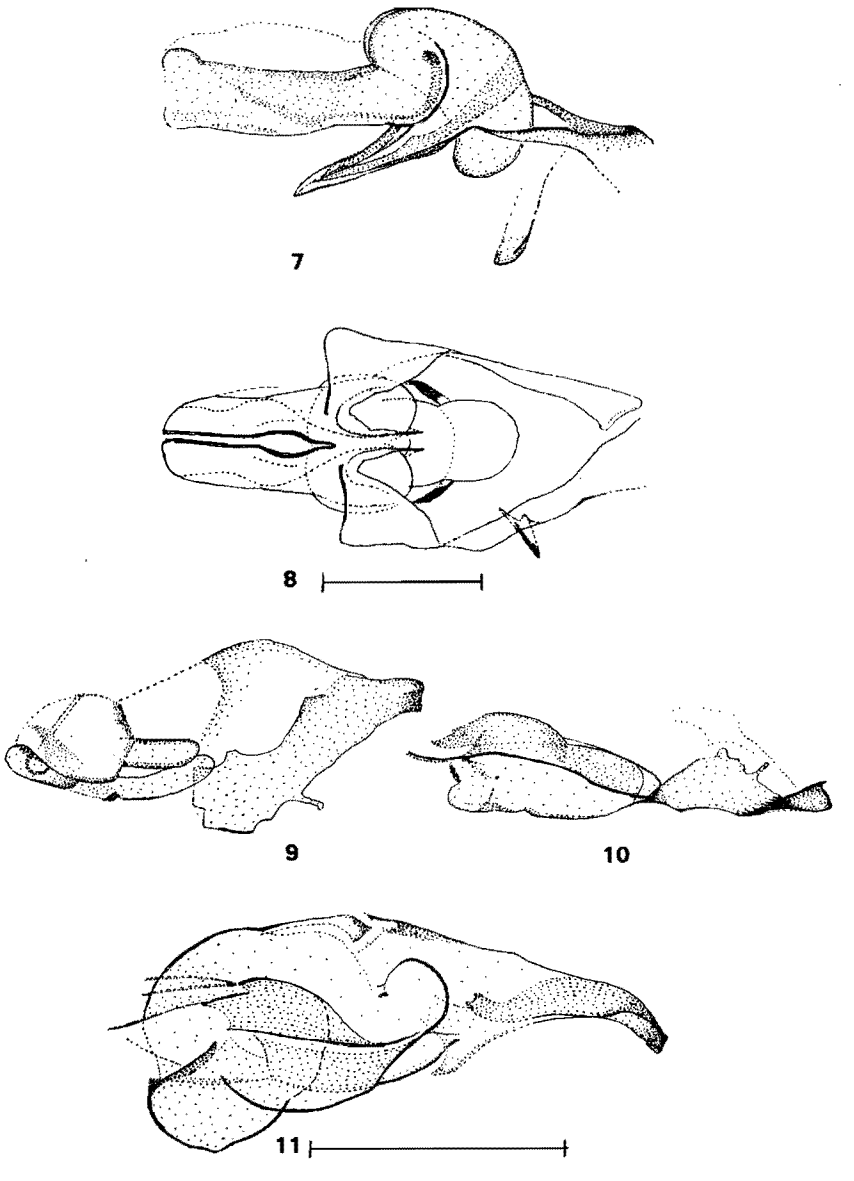

Figs. 7-8. *Agromyza verdensis:* 7. aedeagus, side view; 8. same, ventral view.
Figs. 9-10. *Ophiomyia colei:* 9. aedeagus, side view; 10. same, ventral view.
Fig. 11. *O. labiatalis:* aedeagus, side view.

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nr. Stellenbosch, five ♂♂, three ♀♀, emerged 30.1-6.II.1964 from leaf-mines on Sonchus oleraceus, collected 23-26.I.1964, K.A.S.

This species has recently been transferred from *Melanagromyza* to *Ophiomyia* (Spencer, 1964b: 782).

Ophiomya colei spec. nov., figs. 9 and 10

Extremely close to *O.verdalis* Spencer, with only the following minor points of difference in external characters: vibrissal horn in male more finely tapering, mesonotum entirely shining black, without mat undertone, veins dark, last and penultimate sections of m 3 + 4 equal;

♂*-Genitalia:* aedeagus as in figs. 9 and 10, one arm only of basiphallus strongly chitinized, very irregular.

Leaf-mine: discussed and illustrated by Spencer (1960a: 31 and fig. 21a, as *verdalis*).

♂-Holotype: TRANSVAAL: Pretoria, 25.VII.1959, ex leaf-mine on Coleus species, probably hybridus Hort. (Labiatae), A. C. van Bruggen; ♂-paratype, same data. Holotype in Plant Protection Research Institute, Pretoria, paratype in author's collection.

The differences in genitalia between this species and *O. verdalis* are immediately apparent, despite the close similarity of the adults in external characters.

O.colei, together with a further new species, *O. ocimi*, described below can be included in a revised and extended couplet 5 of the author's key to African *Ophiomyia* species (1959: 296) as follows:

5	Minute species, wing length at most 1.6 mm; facial keel narrow, mesonotum mat, almost greyish	**ocimi**
—	Larger species, wing length at least 1.9 mm	5a
5a	Facial keel narrow between antennae, not greatly widening below	5b
—	Facial keel widely separating bases of antennae	6
5b	Last section of vein m 3 + 4 slightly shorter than penultimate, veins pale; vibrissal horn in male with distinct angular bend at end; mesonotum somewhat mat	**verdalis** Spencer
—	Last and penultimate sections of m4 equal, veins dark; vibrissal horn uniformly curving; mesonotum entirely shining	**colei**

Ophiomyia labiatalis Spencer, 1959, fig. 11

The aedeagus of a paratype is shown in fig. 11.

Ophiomyia ocimi spec. nov., figs. 12 and 13

Head (fig. 12): jowls distinctly projecting, forming angle of about 60°, one-sixth vertical height of eye; vibrissal horn in male stout at base, with angular

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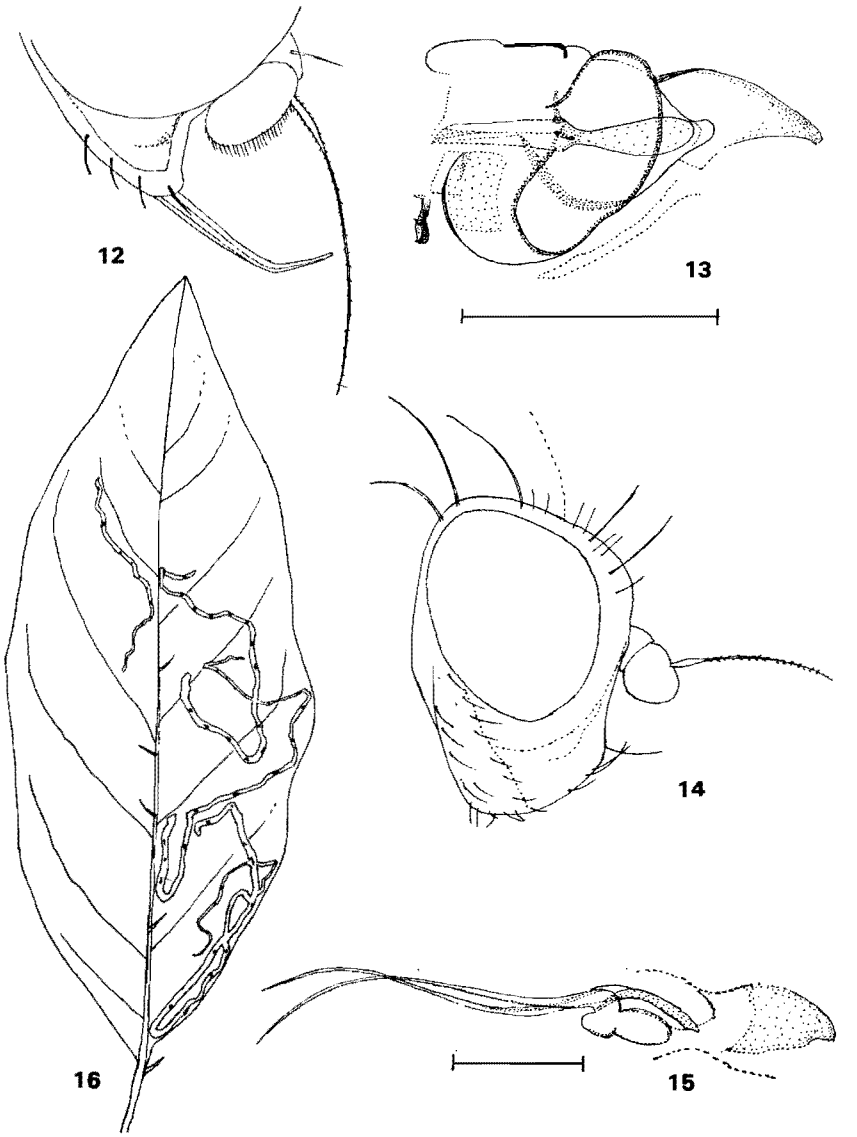

Figs. 12-13. *Ophiomyia ocimi:* 12, head; 13, aedeagus.
Figs. 14-15. *O. perversa:* 14, head; 15, aedeagus.
Fig. 16. *O. solanivora:* leaf-mine on Solanum panduraiforme.

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bend at end; facial keel extremely narrow, not raised; arista fine, bare. *Mesonotum:* acrostichals sparse, in four rows. *Wing:* length in male 1.5 mm, in female 1.6 mm, costa extending strongly to vein m 1 + 2, last and penultimate sections of m4 equal, first cross vein well beyond midpoint of discal cell. *Legs:* mid-tibiae without lateral bristles. *Colour:* orbits and ocellar triangle not shining; mesonotum conspicuously mat, almost greyish; abdomen only moderately shining; squamae grey, margin and fringe black.

♂-*Genitalia:* aedeagus as in fig. 13, with conspicuous black, U-shaped process in front.

Puparium: essentially greyish, with segment boundaries scarcely defined from above, laterally smooth purplish bands alternating with greyish bands lined with some six rows of minute tubercles; posterior spiracles widely separated, each with three bulbs.

♂-Holotype: GUINEA: Conakry, XI.1964, ex leaf-mine on Ocimum gratissimum L., C. F. Reed; five ♂- and two ♀-paratypes, same data. Holotype and three paratypes in U.S. National Museum, Washington, four paratypes in author's collection.

Ophiomyia perversa spec. nov., figs. 14 and 15

Head (fig. 14): frons broad, twice width of eye, distinctly projecting above eye, orbits pronounced, with two *ors* and two *ori*, all approximately equal; orbital setulae sparse, reclinate, abnormally long; ocellar triangle small, lunule conspicuously broad and large, higher than a semicircle; cheeks forming broad ring below eye, jowls exceptionally deep, about half vertical height of eye, rounded but deepest in front, vibrissa slender, normal; third antennal segment small, round, arista short, antennal separated at base by narrow, sharp keel. *Mesonotum:* second *dc* unusually small, little more than half length of first, at level of intra-alar; acrostichals in some eight rows in front, a few scattered hairs extending to level of first *dc*. *Wing:* length 2.4 mm, costa extending only weakly to vein m 1+2, last section of m4 two-thirds penultimate, first cross-vein well beyond midpoint of discal cell. *Legs:* mid-tibiae without lateral bristles. *Colour:* entirely black, ocellar triangle and orbits weakly shining, mesonotum and abdomen brilliantly so; squamae grey, margin and fringe black.

♂-*Genitalia:* aedeagus distinctive, distiphallus ending in two long tubules (fig. 15), basiphallus tubular, chitinised area bowl-shaped; surstyli rounded, broad, fringed with weak hairs; ninth sternite with short hypandrial apodeme and distinct ventral curvature.

♂-Holotype: NATAL: Royal Natal National Park, Drakensberg Mts., 1530 m, from montane forest, 16.IX.1963, B. and P. Stuckenberg.

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This species can be included in a further extension to couplet 7 of the author's key to African *Ophiomyia* species (1959), as previously amended by Spencer (1961c: 420):

7 Jowls at most one-quarter vertical height of eye 7a
— Jowls almost half vertical height of eye; male without vibrissal fasciculus . . **perversa**
7a Facial keel conspicuously widening between antennae . . . **rhodesiensis** Spencer
— Facial keel narrow 7b
7b Large species, wing length 2.7 mm, mesonotum somewhat shining **nigerrima** Spencer
— Small species, wing length 2 mm, mesonotum mat . . . . . **mesonotata** Spencer

O. perversa might easily be mistaken for a *Melanagromyza* species. It could be identified in the author's key to African *Melanagromyza* species, in an extension to couplet 46, as amended by Spencer (1960a: 22), which should now be further extended as follows:

46a No epistoma present 46b
— Distinct epistoma present 47
46b Squamal fringe at most brown; abdomen coppery or purple **cotyledonus** Spencer
— Squamal fringe jet black; abdomen shining black without any metallic coloration; jowls exceptionally deep, almost one-half vertical height of eye . . . . . **perversa**

The generic position of this species is not entirely clear; the form of genitalia, the lack of mid-tibial bristles, the reduced costa and the characteristics of the head indicate that it is not monophyletic with typical *Melanagromyza* species. It is tentatively placed in *Ophiomyia*, but here it occupies an isolated position with no obvious sister species known at the present time.

Ophiomyia solanivora Spencer, 1961, fig. 16

TRANSVAAL: Pretoria, leaf-mines on Solanum panduraiforme Drege, 19.I.1964, K.A.S. The leaf-mine (fig. 16) of this species has not previously been illustrated.

Ophiomyia verdalis Spencer, 1959, fig. 17

I have now examined the genitalia of the holotype from Nicolau, Cape Verde Islands and the aedeagus is shown in fig. 17; the side-arms of the basiphallus are narrow, regular and there is a conspicuous asymmetrical extension of the distiphallus on one corner. Re-examination of the specimens bred from leaf-mines on Coleus species at Pretoria (Spencer, 1960a: 31) shows that they do not represent *O. verdalis* as originally thought, and they are described above as *colei* spec.nov.

Ophiomiya visenda spec. nov., figs. 18 and 19

Head: frons not projecting above eye, one and a half times width of eye; two equal *ors*, two weaker *ori*; orbital setulae fine, sparse, reclinate; apex of ocel-

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lar triangle extending to lower *ors*, lunule small; jowls (fig. 18) greatly extended in front, in centre below eye one-quarter vertical height of eye, cheeks broad, almost reaching eye margin; vibrissal horn fine, white at end (cf. *O. curvipalpis* Zett., Spencer, 1964b: fig. 26); proboscis greatly elongated; facial keel broad, without trace of central furrow, only slightly raised just below base of antennae; third antennal segment small, round, arista fine but swollen at base. *Mesonotum:* acrostichals sparse, in only four rows. *Wing:* length in male 1.9 mm, costa extending to vein m 1+2, last and penultimate sections of m4 equal, first cross-vein just beyond centre of discal cell. *Legs:* mid-tibia without lateral bristles. *Colour:* entirely black; orbits and ocellar triangle scarcely, mesonotum and abdomen strongly shining; squamae pale grey, margin and fringe brownish-black.

♂-*Genitalia:* aedeagus as in fig. 19, distiphallus complex strongly chitinized, blackish, with distinct raised process above; diverging side-arms of basiphallus and ventral curvature of ninth sternite typical of genus.

♂-Holotype: CAPE PROVINCE: Barkly East Distr., Lundean's Nek, 1925 —2100 m, 18.I.1963, B. and P. Stuckenberg; in Natal Museum, Pietermaritzburg.

This species can be included in an extension to couplet 3 of the author's key to African *Ophiomyia* species: for *acutalis* read 3a, add new couplet:

3a Facial keel bulbous, relatively large species, wing length 2.4 mm . . **acutalis** Spencer
— Facial keel broad but flat, small species, wing length 1.9 mm . . . . . **visenda**

This species somewhat resembles *O. acutalis* Spencer, 1959, described from the Congo, of which only the female is known, but until males from the same geographical area are available permitting its full identification, it seems justified to treat the South African specimen as representing a new species.

Genus *MELANAGROMYZA* Hendel, 1920

Examination of further material considered here has again confirmed the importance of ♂-genitalia for obtaining a positive identification of many of the closely-ralated species in this genus. As a result of further genitalia studies three new synonyms have come to light and one new species has been discovered. In all eight new species are described below.

Melanagromyza albisquama (Malloch), 1927

Agromyza (**Melanagromyza**) **albisquama** Malloch, 1927 (cf. Spencer, 1963b: 145).
Melanagromyza leguminum Bezzi, 1928 (cf. Spencer, 1963b: 145).
M. minora Spencer, 1959: 279.
M. desmodii Spencer, 1960a: 23, **syn. nov.**
M. compositarum Spencer, 1961a: 70.

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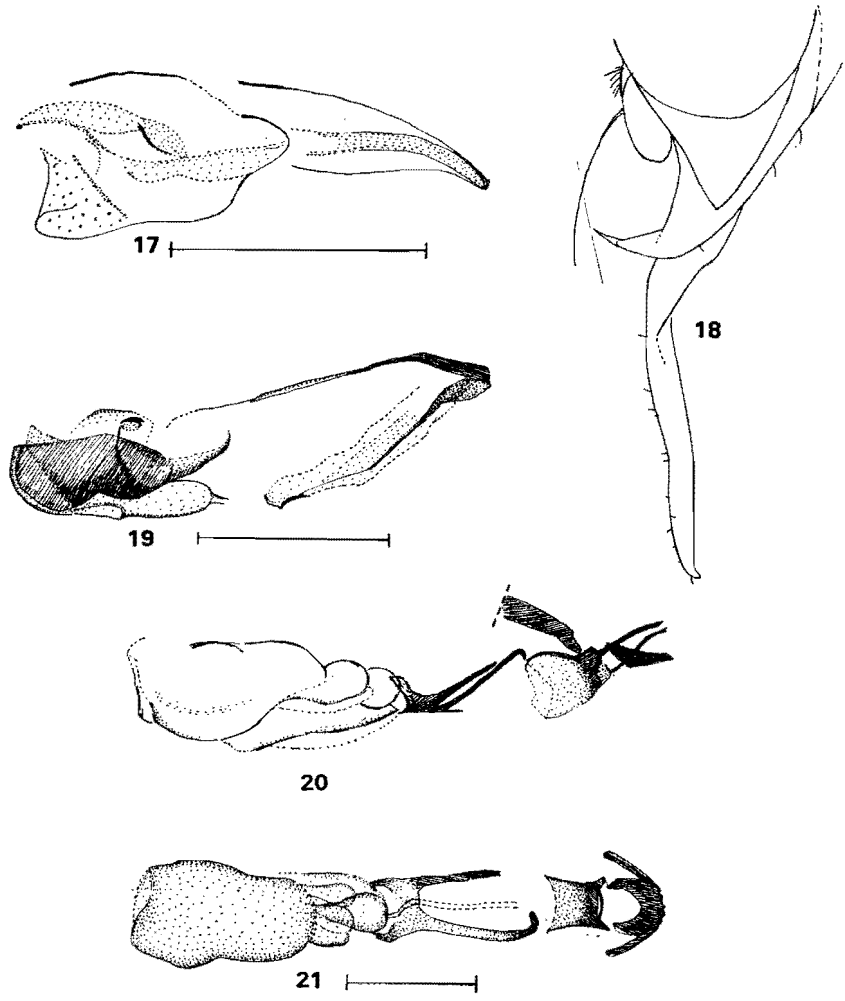

Fig. 17. *Ophiomyia verdalis:* aedeagus.
Figs. 18-19. *O. visenda:* 18, head; 19, aedeagus.
Figs. 20-21. *Melanagromyza ballardi:* 20, aedeagus, side view; 21, same, ventral view.

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Recent examination of the genitalia of the ♂-holotype of *M.desmodii* from Mauritius, bred from seeds of Desmodium frutescens, has shown that this species is synonymous with *M.albisquama* (Malloch).

M. leguminum Bezzi from Fiji was recorded as bred from "pods of No. 51 C.T.W." It is now reasonable to assume that the host in this case was Desmodium species and it remains to be established whether the species also feeds on other species of Leguminosae.

The aedeagus of *M. albisquama* was illustrated by Spencer (1963b: fig. 4a) and the species has also been discussed by Spencer (1962: 669 and 1963c: 311).

This species occurs from the Cape Verde Islands eastwards to Fiji. *M. floridensis* Spencer, 1963d: 312, found in the Neotropical region and also feeding in seeds of Desmodium, is definitely distinct.

Melanagromyza annae Spencer, 1964

NATAL: Richmond Distr., Enon Forest Mts., 25.I.1964, one ♂, B. and P. Stuckenberg.

This is the second record of this species.

Melanagromyza ballardi spec. nov., figs. 20 and 21

Head: frons not projecting above eye in profile, one and a quarter times width of eye; four orbital bristles, the upper somewhat stronger, orbital setulae very sparse, reclinate; jowls relatively broad, one-fifth vertical height of eye, cheeks forming distinct ring below eye; third antennal segment small, round, with slight but distinct upcurved pubescence, arista long, one and a half times width of eye. *Mesonotum:* two dorso-centrals, acrostichals in six rows. *Legs:* mid-tibia without lateral bristles. *Wing:* length in male 1.75 mm, costa extending to vein m 1+2, last section of m4 only slightly shorter than penultimate, in ratio 14 : 17, first cross-vein well beyond mid-point of discal cell. *Colour:* entirely black, ocellar triangle distinctly, orbits slightly shining; mesonotum entirely shining black, only faintly dusted when viewed from front.

♂-*Genitalia:* distinctive aedeagus as in figs. 20 and 21.

♂-Holotype: CAPE PROVINCE: Port St. Johns, 20-25.XI.1961, B. and P. Stuckenberg; in Natal Museum, Pietermaritzburg.

This species can be included in the author's key to African *Melanagromyza* species (1959) by changing the first alternative of couplet 64, as amended by Spencer, 1964a: 22, to read 64a instead of *vigneae* Séguy and adding new couplet as follows:

64a Aedeagus as in figs. 20 and 21, distiphallus in form of two considerably enlarged bladders . . . . . **ballardi**

— Aedeagus as in Spencer, 1963a: fig. 14, distiphallus ending in two narrow tubules . . **vigneae** Séguy

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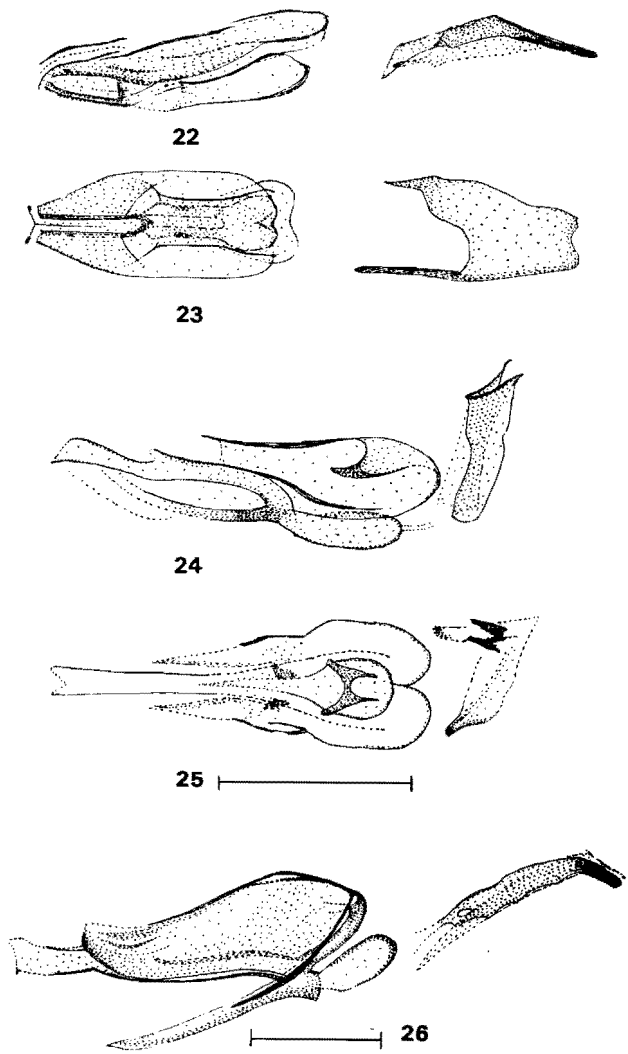

Figs. 22-23. *Melanagromyza cotyledonus:* 22, aedeagus, side view; 23, same, dorsal view.
Figs. 24-25. *M. drakensbergi:* 24, aedeagus, side view; 25, same, dorsal view.
Fig. 26. *M. elgonensis:* aedeagus, side view.

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With the limited material available *M. ballardi* cannot be distinguished on external characters from *M. vigneae* Séguy, but the genitalia of both species are distinctive and totally different.

I have pleasure in naming this species after Mr B. A. Ballard from Durban, who has given me considerable help when collecting in Natal in December, 1961 and in January, 1964.

Melanagromyza cotyledonus Spencer, 1960, figs. 22 and 23

The aedeagus of a paratype is shown in figs. 22 and 23.

Melanagromyza drakensbergi spec. nov., figs. 24 and 25

Head: frons one and a half times width of eye, distinctly projecting above eye in profile; orbits well differentiated, widening at level of lunule below lower *ori*; two strong, equal *ors*, three weaker *ori*; orbital setulae short, in two distinct rows, those nearest eye margin reclinate, the inner row largely proclinate; ocellar triangle well defined, apex extending just below level of lowers *ors*, lunule slightly higher than a semicircle; cheeks forming narrow ring below eye, jowls deepest in centre, one-fifth vertical height of eye; third antennal segment and arista appearing almost bare. *Wing:* length 2.7 mm, costa extending strongly to vein m 1+2 last section of m4 half length of penultimate, first cross-vein at midpoint of discal cell. *Legs:* mid-tibiae with two strong lateral bristles. *Colour:* ocellar triangle and orbits distinctly shining black; mesonotum shining black with distinct greenish-coppery tinge; abdomen greenish-coppery; squamae and fringe white, margin scarcely differentiated.

♂-*Genitalia:* aedeagus as in figs. 24 and 25.

♂-Holotype: NATAL: Drakensberg Mts., Royal Natal National Park, April, 1962, B. and P. Stuckenberg; in Natal Museum.

This species is included on p. 251 in an extension to couplet 26 of the author's key to African *Melanagromyza* species; it closely resembles *M. cussoniae* Spencer, 1964 but the genitalia of the two species are entirely distinct.

Melanagromyza elgonensis spec. nov., figs. 26 and 27

Head: frons very strongly projecting above eye in profile, over one and a half times width of eye; orbits broad, widening anteriorly, with two strong *ors* and two slightly weaker *ori*; orbital setulae numerous, those nearest eye margin reclinate, the inner row largely proclinate; ocellar triangle sunk below plane of frons; lunule higher than a semicircle, enclosed within the broadened orbits; cheeks forming a broad ring below eye; jowls rounded, deepest in centre, one-third vertical height of eye; eye with numerous short, white hairs; third antennal segment small, only slightly pubescent, arista largely bare. *Mesonotum:* two strong *dc*, a third slightly weaker, close beyond second; acrostichals in some eight rows.

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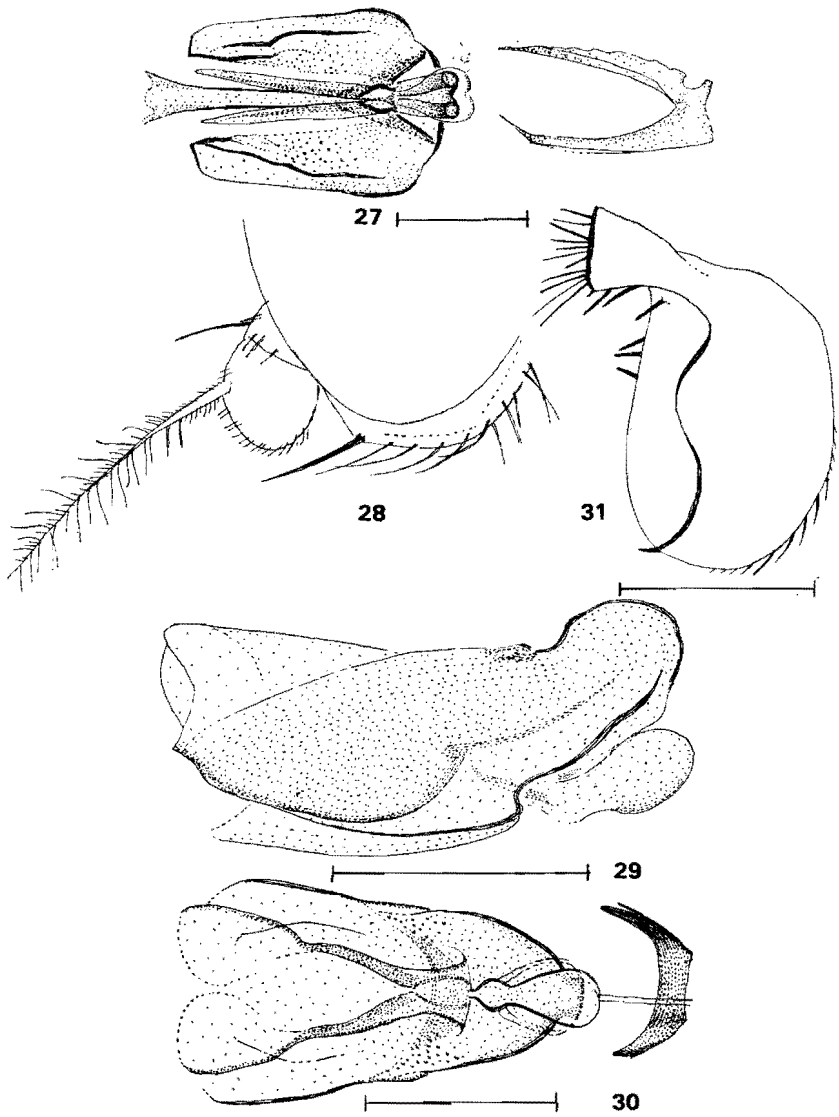

Fig. 27. *Melanagromyza elgonensis:* aedeagus, ventral view.

Figs 28-31. *M. ghanensis:* 28, head; 29, distiphallus complex, side view; 30, aedeagus, ventral view; 31, surstylus.

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Wing: length in male 3.4 mm, costa extending strongly to vein m 1+2, last section of m4 only slightly more than half second, front cross-vein slanting obliquely backwards, at midpoint of discal cell. *Legs:* mid-tibiae with two strong bristles. *Colour:* ocellar triangle and orbits entirely mat, brownish-black, lunule more greyish; mesonotum shining blackish-coppery, abdomen coppery-green; squamae and fringe white, margins orange.

♂-*Genitalia:* aedeagus as in figs. 26 and 27.

♂-Holotype: KENYA: Mt. Elgon, alpine zone, 12-13,000 ft., Feb. 1935, F. W. Edwards, B. M. East Africa Expedition; in British Museum (Nat. Hist.).

The species can be included in a revised couplet 7 of the author's key to African *Melanagromyza* species, including one previous extension (Spencer, 1963a: 103).

7	Lunule large, substantially higher than a semicircle; orbits broad, conspicuous . .	7a
—	Lunule lower, broader	8
7a	Jowls and cheeks conspicuously broad, one-third height of eye	7b
—	Jowls and cheeks narrower, at most one-quarter height of eye	7c
7b	Squamal fringe pale, whitish; very large species, wing length in male 3.9 mm . . .	**elgonensis**
—	Squamal fringe darker, ochreous-brown; smaller species, wing length up to 2.7 mm in female	**cotyledonus** Spencer
7c	Arista plumose	**rutshurensis** Spencer
—	Arista bare	**gymnosporivora** Spencer

Melanagromyza ghanensis spec. nov., figs. 28-31

External characters: as in *M.viridissima* Spencer (1959: 294), apart from smaller size, wing length 2.4 mm, and strikingly plumose arista (fig. 28); other essential characters are: narrow frons and jowls, brilliantly green mesonotum, white squamal fringe.

♂-*Genitalia:* aedeagus as in figs. 29 and 30, unusually large; surstyli (fig. 31) with about 12 long hairs at end some seven spines on inner margin.

♂-Holotype: GHANA: Accra, on Msauwan Road, 27.XII.1920, J. W. Scott Macfie; in British Museum (Nat. Hist.).

This species can be included in a further extension of couplet 28, as amended by Spencer (1963a: 99), as follows:

28	Large species, wing length 2.8-3.3 mm; mesonotum brilliantly shining-green; aedeagus as in figs. 42 and 43; (Larva in seeds of Thunbergia species) . .	**viridissima** Spencer
—	Smaller species	28aa
28aa	Mesonotum brilliantly shining-green; arista strikingly plumose (fig. 28); aedeagus as in figs. 29 and 30	**ghanensis**
—	Mesonotum greenish-black or greenish-coppery; arista with at most normal pubescence	28a

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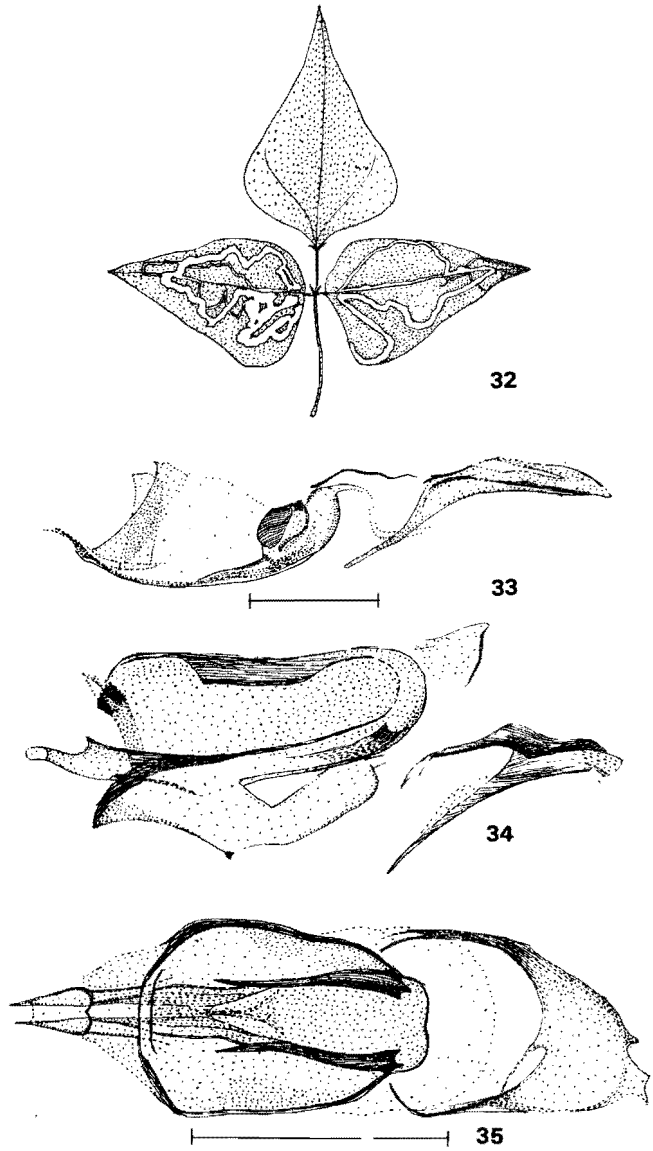

Fig. 32. *Melanagromyza jonesi:* leaf-mine on Dolichos gibbosus.
Fig. 33. *M. kenyensis:* aedeagus.
Figs. 34-35. *M. montana:* 34, aedeagus, side view; 35, same, dorsal view.

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Melanagromyza jonesi Spencer, 1964, fig. 32

Melanagromyza dolichi Sehgal, 1965: 3, **syn. nov.**

CAPE PROVINCE: Kirstenbosch, 30.I.1964, one ♀ bred from leaf-mines on Dolichos gibbosus Thbg., found 25.I.64. Similar mines were also found on the west side of Table Mountain near the lower cable station.

This species was described from Addis Ababa, where it was bred from leaf-mines on Glycine javanica L. by Prof. E. M. Hering. Although I saw the specimens of *dolichi* Sehgal before the species was described, I failed at that time to recognize that the specimens represented *M.jonesi.* I am now satisfied that Sehgal's specimens, bred from Dolichos lablab L. at Namkum, N. India, are identical with *M.jonesi*, which is clearly a widespread Ethiopian-Oriental species.

The larva of this species forms a long, whitish, upper surface mine with frass deposited in conspicuous, widely-spaced black grains. Numerous mines may occur in a single leaf (fig. 32).

Melanagromyza kenyensis Spencer, 1959, fig. 33

The aedeagus of the holotype, bred "ex Compositae 7" is shown in fig. 33; this departs substantially from the form of typical stem-boring *Melanagromyza* species. It now seems possible that the species may be a leaf-miner and its correct generic placing will in due course require further consideration.

The aedeagus has also been examined of one of the specimens bred "ex Croton sp." This is identical in all respects with that of the holotype.

Melanagromyza lindneri Spencer, 1961,

CAPE PROVINCE: Barkley East Distr., Lundean's Nek, 1925-2100 m, 18.I.1963, two ♂♂, two ♀♀, B. and P. Stuckenberg.

This species has been recorded from Tanganyika and Addis Ababa but the female was not previously known.

Melanagromyza montana spec. nov., figs. 34 and 35

Head: frons broad, almost twice width of eye, orbits very pronounced, greatly widening anteriorly, substantially projecting above eye, two strong, equal *ors*, two weaker *ori*; orbital setulae in at least two rows, largely reclinate but those in front proclinate; ocellar triangle broad but short, indistinct; lunule high and narrow, margin just above level of upper *ori*, only one-quarter overall width of frons; eye with distinct patch of hairs at level of upper *ors*, scattered hairs elsewhere; cheeks forming distinct ring below eye, jowls deepest at rear, in centre one-sixth vertical height of eye; arista long, only slightly shorter than eye height, distinctly pubescent. *Wing:* length in male 3.5 mm, costa extending strongly to vein m 1+2, last section of m4 only slightly longer than half penultimate, in ratio 23 : 39, first cross-vein at midpoint of discal cell. *Legs:* mid-tibiae with two strong lateral bristles. *Colour:* frons dull, sooty black, ocellar triangle and orbits scarcely shining; mesonotum shining blackish but faintly greenish-coppery, abdomen coppery with tendency to purple; squamae and fringe white, margin pale, yellowish-orange.

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♂-*Genitalia:* aedeagus as figs. 34 and 35, tubule of distiphallus slightly extended, bladder of mesophallus with characteristic curvature, additional weakly chitinized process behind and above distiphallus complex; ninth sternite broadly fused at apex; surstyli rather narrow.

♂-Holotype: NATAL: Royal Natal National Park, 1500 m, from montane forest, 16.IX.1963, B. and P. Stuckenberg; in Natal Museum, Pietermaritzburg.

This species can be included in an extension of couplet 25a of the author's key to African *Melanagromyza* species, as already extended by Spencer (1960a: 17), as follows:

25a Medium-sized species, wing length 2.5-2.7 mm 26

— Large species, wing length 2.8-3.4 mm 25aa

25aa Frons almost twice width of eye, distinctly projecting above eye in profile; lunule high and narrow, one-quarter width of frons; arista plumose . . . . . **montana**

— Frons one and a quarter times width of eye, not projecting above eye; lunule lower, broader, half width of frons; arista largely bare . . . . . **seneciocaulis** Spencer

The aedeagus indicates that this species is almost certainly an internal stem-borer; it somewhat resembles *M. purpurea* Spencer, 1959, described from Pietermaritzburg but lacks the brilliantly shining ocellar triangle of this latter species.

Melanagromyza nairobensis Spencer, 1959, fig. 36

The aedeagus of the holotype from Nairobi is shown in fig. 36.

I previously (1959: 280) referred to this species specimens from Tanganyika, the Congo, Uganda and Kenya, but examination of the genitalia shows these specimens to represent distinct species, which I am unable to discuss further at the present time.

Melanagromyza nudifolii spec. nov., fig. 37

Head: frons not projecting above eye in profile, one and a half times width of eye; four orbital bristles, upper *ors* slightly stronger, orbital setulae in single row, reclinate; jowls deepest in centre below eye, one-sixth vertical height of eye; eye with scattered hairs in female; third antennal with slight pubescence, arista appearing bare. *Wing:* length in female 2.6 mm, costa extending to vein m 1+2, last section of m 4 almost two-thirds penultimate, first cross-vein just beyond midpoint of discal cell. *Legs:* mid-tibia with two strong lateral bristles. *Colour:* ocellar triangle slightly shining black, mesonotum strongly shining, blackish-green, abdomen slightly more coppery; squamae and fringe silvery-white, margin pale yellowish.

Puparium: white, posterior spiracular processes arising from slight protuberance, separated by slightly more than own diameter, each with an ellipse of seven bulbs around the short, slender black horn (fig. 37).

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♂-Holotype: NATAL: Gillitts, 7.II.1964, from larva in stem of Helichrysum nudifolium Less. var. quinquenerve (Less.) (det. Dr Gordon-Gray), collected 29.I.1964, K.A.S., in author's collection.

This species can be included in a further extension of couplet 26, as extended by Spencer, 1963a: 98 and 1964a: 23, as follows:

26b Last section of vein m4 half or less than penultimate 26c
— Last section of m4 longer 26d
26c Posterior spiracles of larva with 16 bulbs (Spencer, 1960a: fig. 10), puparium orange-yellow . . . . . **gerberae** Spencer
— Posterior spiracles with seven bulbs (fig. 37), puparium white . . . . . **nudifolii**
26d Two *ori*; aedeagus as in Spencer (1964a: figs. 18, 19) . . . . . **cussoniae** Spencer
— Three *ori*; aedeagus as in figs. 24, 25 . . . . . **drakensbergi**

M. nudifolii closely resembles *M. gerberae* Spencer, 1960 but the differences in puparia confirm the distinctness of the two species.

Melanagromyza scottburghensis spec. nov., figs. 38 and 39

Head: frons not projecting above eye in profile, one and a half times width of eye; orbits not greatly differentiated, with four equal orbital bristles, orbital setulae short, reclinate, apart from one or two hairs in front; ocellar triangle narrow, long, apex extending to level of lower *ors*; jowls one-sixth vertical height of eye, deepest in centre, cheeks linear; third antennal segment round at end, arista long, approximately two-thirds eye height. *Mesonotum:* second *dc* long, at level of supra-alar, acrostichals in some eight rows. *Legs:* mid-tibia with two lateral bristles, the upper normally slightly weaker. *Wing:* length in male 2.4, in female 2.7 mm, costa extending to vein m 1+2, last section of m4 three-fifths penultimate, first cross-vein just beyond mid-point of discal cell. *Colour:* entirely black; ocellar triangle distinctly shining, orbits weakly so; mesonotum shining black but distinctly grey-dusted when viewed from front, abdomen brilliantly shining black; squamae grey, margin and fringe jet black.

♂-*Genitalia:* aedeagus as in fig 38, distiphallus long, with the central tubule lying between two diverging sidepieces; largely membranous mesophallus complex above base of distiphallus; ninth sternite (fig. 39) broad at apex; blade of spermal sac narrow.

♂-Holotype: NATAL: Scottburgh, 15.XI.1963; four ♀-paratypes: same data, B. and P. Stuckenberg. Holotype and three paratypes in Natal Museum, Pietermaritzburg, one paratype in author's collection.

The new species can be included in a further extension to couplet 55 of the author's key to African *Melanagromyza* species, as amended by Spencer, 1964a: 27, as follows:

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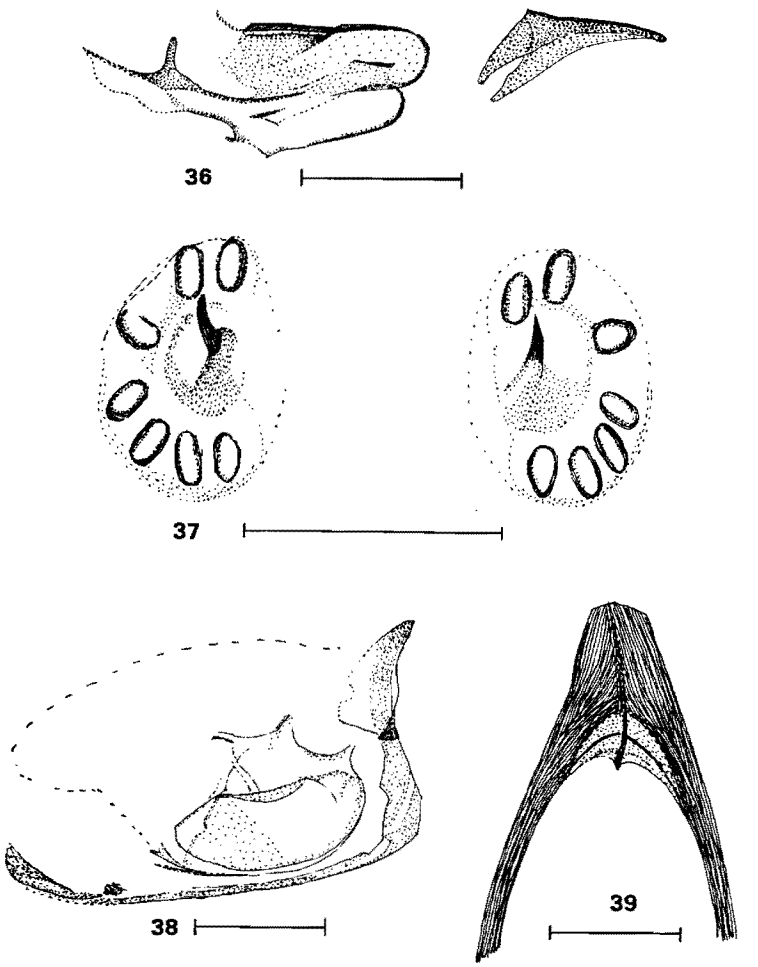

Fig. 36. *Melanagromyza nairobensis:* aedeagus.
Fig. 37. *M. nudifolii:* posterior spiracles of puparium.
Figs. 38-39. *M. scottburghensis:* 38, aedeagus; 39, ninth sternite.

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55a Large species, wing length in male 3 mm; arista long, pubescent . . **luthulii** Spencer
— Smaller species, wing length in male 2.4, in female 2.7 mm; arista shorter, bare . . 55b
55b Mid-tibiae without lateral bristles; squamal fringe brownish-black **difficilis** Spencer
— Mid-tibiae with two bristles; squamal fringe jet black . . . . . **scottburghensis**

The ♂-genitalia suggest this species occupies an isolated position but possibly with some affinity with *M. pubescentis* Spencer (cf. Spencer, 1964a: figs. 26 and 27).

Melanagromyza sojae (Zehntner), 1900, cf. Spencer, 1961a: 77

NATAL: Umvoti Distr., nr. Lilani, April 1962, one ♂; Gillitts, 29.XI. 1962, one ♂, both B. and P. Stuckenberg.

These are the first records of this pest on leguminous crops from South Africa. The species is common in Egypt and wide-spread throughout the Oriental Region and Pacific area.

For inclusion in the author's key to African *Melanagromyza* species, see p. 255.

Melanagromyza solanidis Spencer, 1959, figs. 40 and 41

Melanagromyza lamborni Spencer, 1959: 277, **syn. nov.**

I have now examined the genitalia of these two species and am satisfied that they are identical. The aedeagus of the paratype of *M. solanidis* is shown in figs. 40 and 41; this is distinctive in the unusually long, membranous gap between the distiphallus and basiphallus.

In *M. lamborni* the mesonotum was described as "shining bluish-black", while in *M. solanidis* it was stated to be "shining dark, blackish-green". The colour of the mesonotum is thus variable, and led me to believe originally that two separate species were involved.

Melanagromyza viridissima Spencer, 1959, figs. 42-44

The genitalia of the male bred from seeds of Thunbergia species at Mposa, Zululand (Spencer, 1960a: 27) have now been examined. The aedeagus is shown in figs. 42 and 43, and the distinctive surstyli in fig. 44.

The specimen from Ghana identified as *viridissima* (Spencer, 1963a: 107) has now been found to represent a distinct species, which is described as *M. ghanensis* spec. nov. on p. 247. This is a substantially smaller species than *M. viridissima*.

Melanagromyza volubilis spec. nov., fig. 45

Exactly as in *M. sojae* (cf. Spencer, 1961a: 77; 1961c: 417) with following wing points of difference: jowls much narrower, one-twelfth height of eye, mesonotum distinctly mat, not conspicuously shining, slightly smaller, wing length

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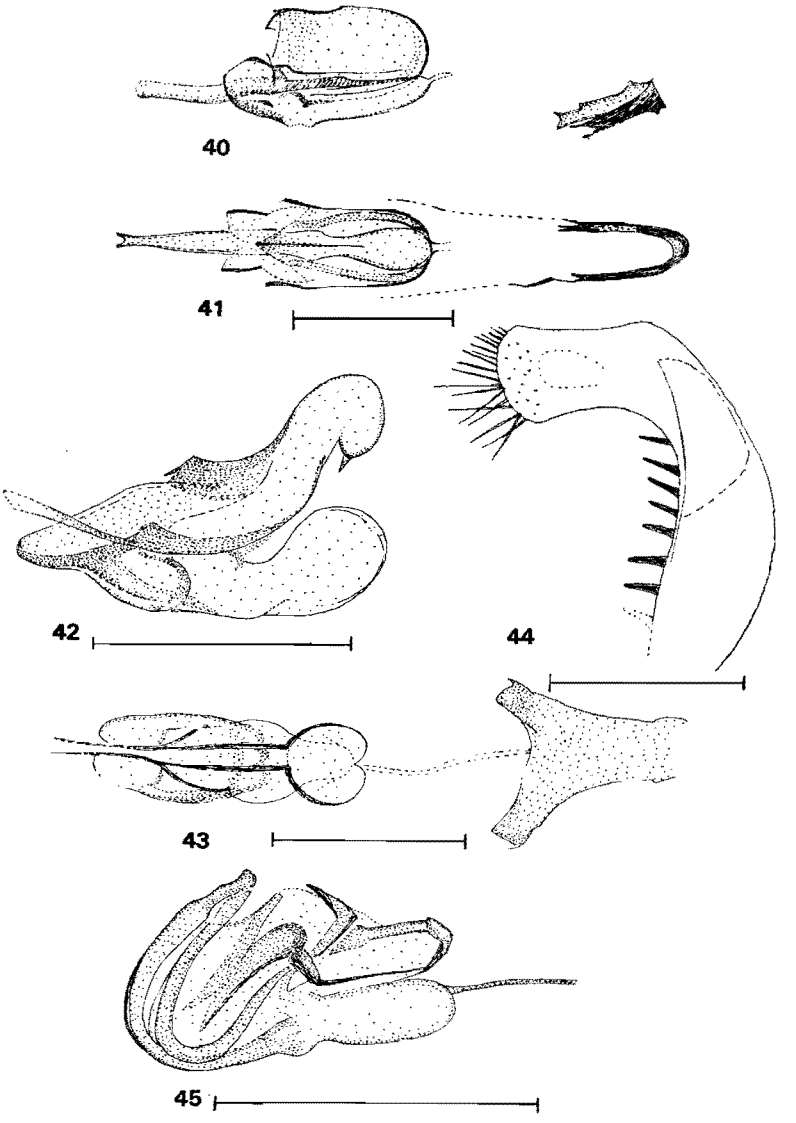

Figs. 40-41. *Melanagromyza solanidis:* 40, aedeagus, side view; 41, same, ventral view.
Figs. 42-44. *M. viridissima:* 42, distiphallus complex, side view; 43, aedeagus, dorsal view; 44, surstylus.
Fig. 45. *M. volubilis:* aedeagus.

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1.75 mm; ♂-genitalia: aedeagus (fig. 45) strikingly distinctive, with wide membranous gap between distiphallus and basiphallus.

♂-Holotype: CAPE VERDE ISLANDS: Nicolau, Chà da Preguisa, 13-17. XII.1953, Lindberg; in Zoological Museum of University, Helsinki.

This species, together with *M. sojae* and *M. crotalariana* Spencer (not *cunctans*, see Spencer, 1961c: 417), can be included in a further extension of couplet 20a of the author's key to African *Melanagromyza* species, as already amended (Spencer, 1960a: 24), as follows:

20a Mesonotum predominantly shining black 20b
— Mesonotum distinctly mat, greyish; jowls narrow . . . . . **volubilis**
20b Jowls relatively broad, about one-sixth vertical height of eye . . . **sojae** (Zehntner)
— Jowls narrower, one-tenth height of eye . . . . . **crotalariana** Spencer

Genus *CERODONTHA* Rondani, 1861

Nowakowski (1962) has extended the concept of this genus following genitalia studies to include the subgenera *Dizygomyza*, *Poemyza* and *Icteromyza* of Hendel's conglomerate genus *Dizygomyza* (Hendel, 1931-6: 17). The two species discussed below are accordingly now transferred to the genus *Cerodontha*.

Cerodontha (*Dizygomyza*) *aristella* (Spencer), 1961, **comb. nov.**

Phytobia (**Poemyza**) **aristella** Spencer, 1961d: 338.

NATAL: Pietermaritzburg, Town Bush, leaf-mine on Setaria chevalieri, 30.I.1964 produced one female, 14.II.1964, K.A.S.

RHODESIA: Victoria Falls, numerous leaf-mines on same host, 1.II.1964.

This species has been recorded from Natal (Spencer, 1963a: 114) but has not previously been bred and the host-plant has hitherto been unknown. The puparium appears to be indistinguishable from that of *P. setariae* Spencer, 1959 described from Sierra Leone but in this species the head is largely bright yellow.

All the puparia found at Victoria Falls were parasitised by a minute chalcid (*Chrysocharis* species, Entodontinae, det. Graham), three specimens emerging from a single puparium. This is the first case known to me of more than a single parasite being found in an agromyzid puparium.

Cerodontha (*Dizygomyza*) *magnificans* (Spencer), 1959, **comb. nov.**

Phytobia (**Poemyza**) **magnificans** Spencer, 1959: 305.

NATAL: Drakensberg, Giant's Castle Reserve, 5,800 ft., 18-23.IX.1963, one ♀, B. and P. Stuckenberg.

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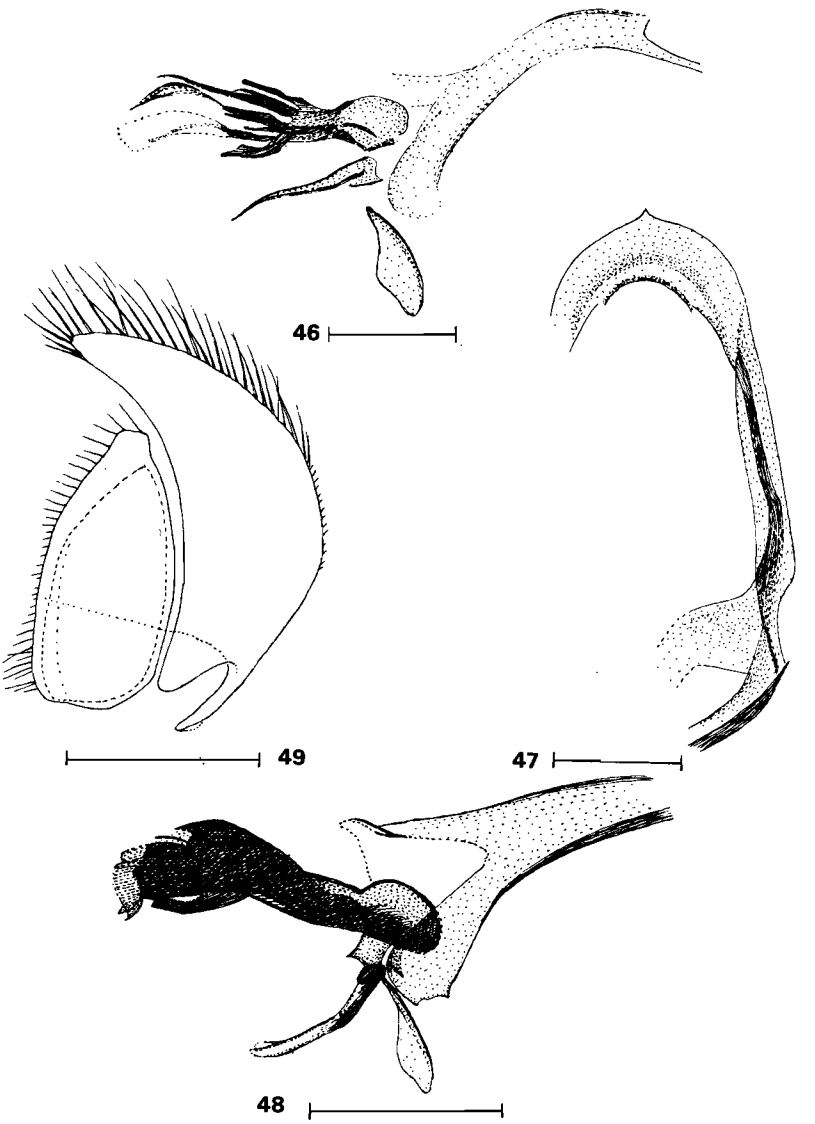

Figs. 46-47. *Phytobia brincki:* 46, aedeagus; 47, ninth sternite.
Figs. 48-49. *Ph. flavosquamata:* 48. aedeagus; 49, surstylus.

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This is the only recorded specimen apart from the ♀-holotype from the Congo.

Genus *PHYTOBIA* Lioy, 1864

Hendel (1931-6) ignored *Phytobia* Lioy, erecting a subgenus *Dendromyza* of the genus *Dizygomyza* to embrace the group of cambium-boring species of the *errans* Meigen group. Kangas (1935) raised *Dendromyza* to full generic rank but Frick (1952: 389), largely following Hendel's concept, treated this group as a subgenus, synonymizing *Dendromyza* with *Phytobia*. Nowakowski (1962: 97) restored *Phytobia* Lioy s. str. to generic rank. Sasakawa (1963) described the new genus *Shizukoa*, but this genus merely represents *Phytobia* and the synonymy was established by Spencer (1965b: 8).

Examination of the genitalia of two species described in the genus *Agromyza*, *flavosquamata* Spencer and *ruandensis* Spencer, confirms that they correctly belong in *Phytobia* and they are now transferred to this genus. Two further species from South Africa are also described.

The African *Phytobia* species can be identified by the following key:

1 Frons reddish, at least in front; antennae entirely reddish-orange . . . . **shizukoae**
— Frons and antennae black 2
2 Pleura and wing base entirely black; arista conspicuously pubescent . . . . . **ruandensis** (Spencer)
— Upper margins of pleura and wing base brown or yellowish; arista fine, bare . . . 3
3 Last m4 section one and a half times penultimate . . . species ined. (Tanganyika)
— Last m4 section at most one and a quarter times penultimate 4
4 Large species, wing length 3.2 mm; aedeagus as in fig. 46 . . . . . **brincki**
— Smaller species, wing length 2.7 mm; aedeagus as in fig. 48 **flavosquamata** (Spencer)

The species of this genus can cause serious damage to young trees, the brown feeding tracks of the larvae being apparent in the mature wood and spoiling it in some cases for subsequent processing.

Phytobia brincki spec. nov., figs. 46 and 47

Essentially as in *P. flavosquamata*, with following points of difference: frons slightly projecting above eye at base of antennae, ocellar triangle not differentiated below foremost ocellus; wing length 3.5 mm, last section of m4 only slightly longer than penultimate, in ratio 33: 28;

♂-*Genitalia:* aedeagus as in fig. 46, distiphallus short, black, conspicuously branching, two arms more extended than the rest; ninth sternite U-shaped (fig. 47).

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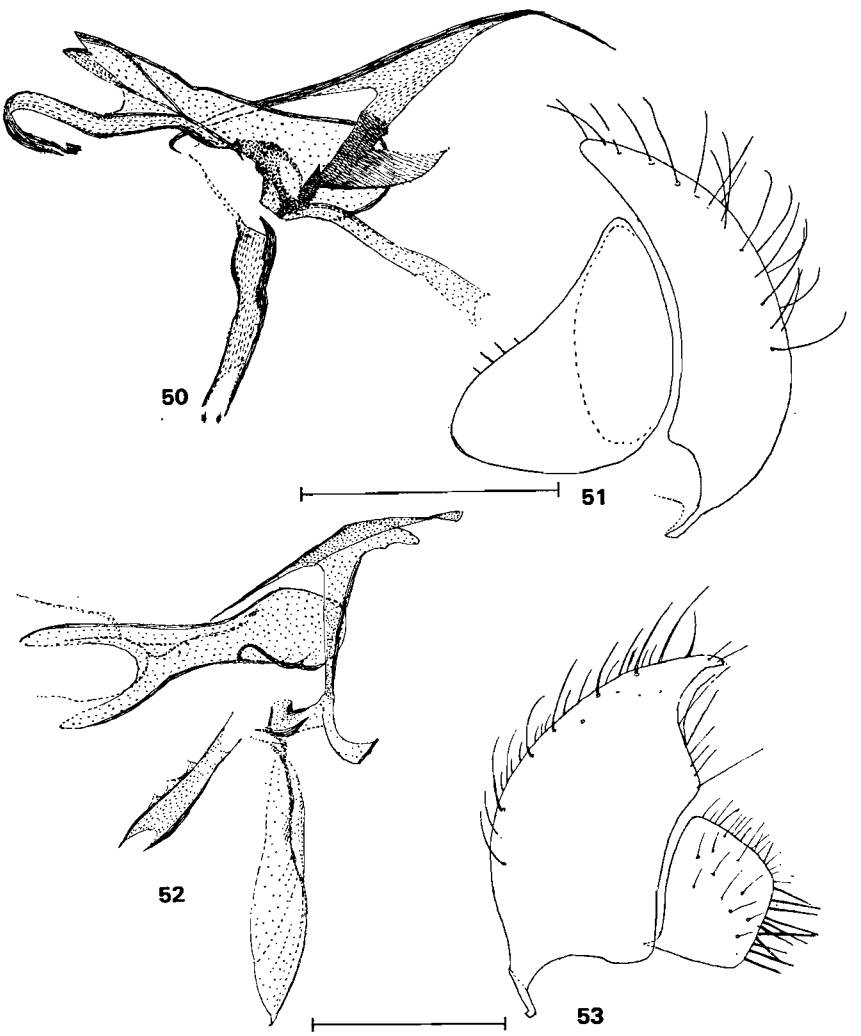

Figs. 50-51. *Phytobia ruandensis:* 50, aedeagus; 51, surstylus.
Figs. 52-53. *Ph. shizukoae:* 52, aedeagus; 53, surstylus.

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♂-Holotype: CAPE PROVINCE: Hout Bay, Skoorsteenkop, 2.XI.1951 (Loc. 161); ♂-paratype, same locality, 22.I.1951 (Loc. 157), leg. Swedish South Africa Expedition. Holotype in Zoological Institute, Lund, paratype in author's collection.

These specimens were previously identified as *flavosquamata* (Spencer, 1960b: 325). The two species are clearly very closely related and, if they overlap geographically, a reliable identification may only be possible from the ♂-genitalia.

Phytobia flavosquamata (Spencer), 1959, figs. 48 and 49, **comb. nov.**

Agromyza flavosquamata Spencer, 1959: 244.

Folowing re-examination of the holotype from Nigeria and comparison with the specimens from the Cape Peninsula, identified as *flavosquamata* by Spencer (1960b: 325), it is now clear that the South African specimens represent a new species, described as *P. brincki*.

The genitalia of these two species are essentially similar. The conspicuously black distiphallus is distinctively branching in *brincki* but more compact in *flavosquamata*, although the divisions are still detectable. The aedeagus of *flavosquamata* is shown in fig. 48 and the surstyli in fig. 49.

Phytobia ruandensis (Spencer), 1959, figs. 50 and 51, **comb. nov.**

Agromyza ruandensis Spencer, 1959: 249.

The aedeagus of the holotype from the Congo is shown in fig. 50 and the surstylus in fig. 51.

Phytobia shizukoae spec. nov., figs. 52 and 53

Head: frons exceptionally broad, over twice width of eye, enormously projecting above eye from lower *ors* to base of antennae; orbits not greatly differentiated, two *ors*, two *ori*, all equal, long, slender; orbital setulae almost lacking, one or two minute reclinate hairs only; ocellar triangle scarcely differentiated, detectable only as faint depression; lunule semicircular, lying vertically, at right-angles to plane of frons; cheeks forming broad ring below eye, jowls deeply extended at rear, third antennal segment narrowing apically; extremely broad epistoma present, as high as jowls are deep. *Mesonotum:* 3 + 1 strong *dc*, third and fourth equal; prescutellars slightly weaker than third *dc*; acrostichals in six rows. *Wing:* length 2.6 mm, costa extending strongly to vein m 1+2, last section of m4 just less than twice penultimate, first cross-vein just beyond centre of discal cell, second conspicuously slanting. *Legs:* mid-tibiae with one or two strong lateral bristles. *Colour:* upper frons and orbits black, frons becoming reddened anteriorly below ocellar triangle; lunule, jowls, antennae uniformly reddish-orange; palpi black; mesonotum dull grey-black; wing-base and narrow margins of mesopleura brownish; legs entirely black; squamae pale grey, fringe black.

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♂-*Genitalia:* aedeagus as in fig. 52, ninth sternite regularly U-shaped; surstyli (fig. 53) separated by distinct suture, with a number of long hairs at end; aedeagal apodeme broader at end, narrowing towards epandrium.

♂-Holotype: NATAL: Scottburgh, 15.XI.1963, B. and P. Stuckenberg; in Natal Museum.

This is a most distinctive species, immediately distinguishable by its colour from the other African species known in the genus.

Phytobia species

TANGANYIKA: Marangu, 1-20.III.1959, one ♀, E. Lindner.

This specimen was previously identified as *Phytobia nigrita* Malloch (Spencer, 1961b: 4); however, I now feel there is reasonable doubt whether it really does represent Malloch's species, which was described from Formosa. The species in this genus are extremely difficult to identify satisfactorily on external characters and I now consider specific identification of this specimen from Tanganyika must be deferred until males are available which can be definitely associated with it.

Genus *LIRIOMYZA* Mik, 1894

Three new species from South Africa are described below and the specimen discussed earlier by Spencer (1961c:) as *Liriomyza* species is also now described as a new species. Since preparation of my original key to Ethiopian species (Spencer, 1959: 309) there have been numerous additions and I feel it would now be helpful to provide a new key of the 11 known African species, as follows:

1	Mesonotum with yellow patch before scutellum	**cordiae** Spencer
—	Mesonotum black to margin of scutellum	2
2	Third antennal segment brownish, distinctly darkened	3
—	Third antennal segment yellow	4
3	Femora yellow, with variable dark markings, very large species, wing length 4.4 mm	**mirifica** Spencer
—	Femora black, yellow at knees; smaller species, wing length 2.4 mm	**atrescens** Spencer
4	Both *vte* and *vti* on black ground	5
—	At least *vte* on yellow ground	6
5	Orbits black or at least faintly brown adjoining eye margin; last section of m4 three times penultimate	**brassicae** (Riley)
—	Orbits entirely yellow; last section of m4 at most two and a half times penultimate . .	**mikaniopsidis** Spencer
6	Upper corner of orbits entirely yellow, both *vti* and *vte* on yellow ground	7
—	*vte* on black ground, at least arising at boundary of yellow and black .	**helichrysivora**
7	Sternopleura entirely black; hind-margin of eye entirely yellow .	**novissima** Spencer
—	Sternopleura with upper margin broadly yellow	8
8	Last section of m4 three times length of penultimate	**melantherae** Spencer
—	Last section of m4 at most two and a half times length of penultimate	9

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9 Minute species, wing length in male 1.4 mm; third antennal segment conspicuously pubescent; femora with brownish mottling . . . . . **nana**

— Larger species, wing length up to 2.2 mm; third antennal segment with normal pubescence 10

10 Femora entirely yellow 11

— Fore-femora with distinct brownish mottling; aedeagus as in Spencer, 1961c: fig. 20 **volatilis**

11 Mesonotum largely shining black; wing length 2-2.2 mm; aedeagus as in Spencer, 1963a: fig. 24a . . . . . **flavalis** Spencer

— Mesonotum distinctly mat, greyish-black; smaller species, wing length 1.75 mm; aedeagus as in fig. 57 . . . . . **mosselensis**

Liriomyza flavalis Spencer, 1959

Examination of the genitalia of the holotype shows that the specimens from Somerset East previously identified as *L. novissima* (Spencer, 1963a: 116) represent this species.

The holotype is a particularly pale specimen and it can now be seen that the yellow area behind the ocellar triangle used as a key character (Spencer, 1959: 309, couplet 6) is not significant. The aedeagus of the holotype is exactly as illustrated for *L. novissima* (Spencer, 1963a: fig. 24a).

In view of the variation in colour of this group it now seems possible that *L. novissima* may be synonymous with *flavalis*. This can only be decided after examination of the genitalia of a male from the same area as the holotype — Camps Bay, Cape Peninsula — which can definitely be associated with it.

Liriomyza helichrysivora spec. nov., fig. 54

Head: frons not projecting above eye, two *ors* and two *ori*, all equal; orbital setulae fine, sparse, reclinate; jowls deep, almost one-quarter vertical height of eye; third antennal segment round, with conspicuous whitish pubescence. *Mesonotum:* acrostichals regular, in four rows. *Wing:* length in female 1.6 mm, discal cell small, last section of m 3+4 three times penultimate. *Colour:* frons, orbits, antennae yellow, *vti* on yellow ground; hind-margin of eye black, *vte* just on black ground; mesonotum shining black, mesopleura black below and up front margin, sternopleura broadly yellow above; *legs:* coxae and femora yellow, latter with faint brownish markings, tibiae and tarsi darker, brownish; *abdomen:* tergites black but with conspicuous yellow hind-margins; squamae yellowish-grey, margin and fringe black.

Leaf-mine (fig. 54): irregular, whitish, upper-surface, with frass in fine grains and larger, more or less connected black strips; pupation externally.

Puparium: yellowish-brown, posterior spiracles each with three bulbs.

♀-Holotype: NATAL: Cascade Falls, Pietermaritzburg, 31.III.1964, ex leaf-mine leg. 29.I.64, on Helichrysum nudifolium Less. var. quinquenerve

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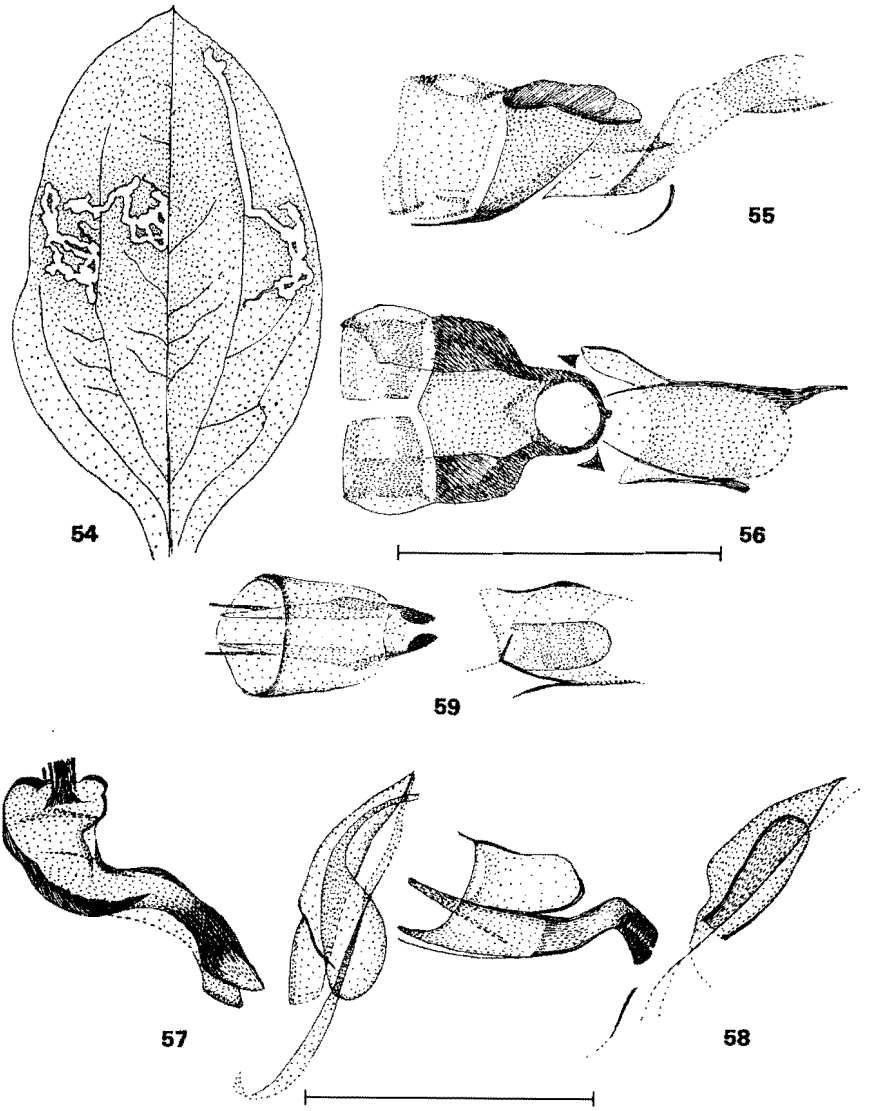

Fig. 54. *Liriomyza helichrysivora:* leaf-mine on Helichrysum nudifolium.
Figs. 55-56. *L. melantherae:* 55, aedeagus, side view; 56, same, ventral view.
Fig. 57. *L. mosselensis:* aedeagus.
Figs. 58-59. *L. nana:* 58, aedeagus, side view; 59, same, ventral view.

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(Less.) (det. Dr Gordon-Gray), K. A. Spencer; in author's collection; ♀-paratype NATAL: Nagle Dam, 19.V.1955, B. Stuckenberg; in Natal Museum (= *Liriomyza* sp. 2, Spencer, 1959: 312).

This species is abundant with its host-plant. I also found numerous empty mines on Helichrysum cooperi Harv. at Town Bush, Pietermaritzburg on 8.XII.1961. It is to be hoped that males will in due course be reared, so that the genitalia can be examined and illustrated.

Liriomyza melantherae Spencer, 1959, figs. 55 and 56

The holotype has been re-examined and the aedeagus is shown in figs. 55 and 56; the distiphallus is unusually large and entirely distinctive.

Liriomyza mosselensis spec. nov., fig. 57

Exactly as in *L. flavalis* apart from following points of difference: smaller, wing length in male 1.75 mm, discal cell small; mesonotum not shining, distinctly dull, blackish-grey; ♂-genitalia: aedeagus conspicuously black, as in fig. 57).

♂-Holotype: CAPE PROVINCE: Mossel Bay, 29.XI.1938, R. E. Turner, in British Museum (Nat. Hist.).

The genitalia of this species indicate that it is a grass-feeder.

A second specimen, a female from Basutoland, Maseru Distr., Bushman's Pass, Maloti Mts., 2125-2250 m, 8-14.I.1963, B. and P. Stuckenberg, almost certainly represents this species; it is slightly larger, wing length 2.3 mm, and the mesonotum is even more greyish but otherwise agrees with the holotype in all respects.

Liriomyza nana spec. nov., figs. 58 and 59

Head: (largely deformed) orbital setulae sparse, virtually lacking; jowls deep at rear; third antennal segment with fine white pubescence. *Mesonotum:* acrostichals irregular, in four rows. *Wing:* length in male 1.4 mm, last section of vein m 3+4 two and a half times penultimate, second cross-vein conspicuously slanting. *Colour:* frons, orbits, hind-margin of head and antennae bright yellow; mesonotum shining black; lower half of mesopleura diagonally black, sternopleura with broad yellow margin above; *legs:* femora predominantly yellow but distinct brown mottling, tibiae and tarsi brown.

♂-*Genitalia:* aedeagus distinctive, as in figs. 58 and 59; surstyli not differentiated.

♂-Holotype: CAPE PROVINCE: Ceres, April 1923, R. E. Turner, in British Museum (Nat. Hist.).

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Liriomyza volatilis spec. nov.

This species was briefly discussed by Spencer (1961c: 425) as *Liriomyza* species. Having now reviewed all known African *Liriomyza* species, I am satisfied that it represents an undescribed species. It is extremely close to *L. flavalis* in general appearance but the genitalia are entirely different and show that the two species are not closely related.

The essential characters of the new species are as follows:

Head: four equal, relatively strong orbital bristles, orbital setulae sparse, in single row; jowls broad, deeper behind; third antennal segment round, virtually bare. *Mesonotum:* acrostichals in four rows, somewhat irregular. *Wing:* length 1.9 mm, last section of vein m4 twice penultimate. *Colour:* frons, orbits, antennae bright yellow; hind-margin of head almost entirely yellow, with slight brownish patch approaching eye margin beyond *vte*; mesonotum black but not conspicuously shining, large yellow patches at hind-corners; pleura largely yellow but mesopleura with black patch on lower margin in front, sternopleura black below, yellow on upper margin; *legs:* fore-femora with conspicuously brownish-mottling above, otherwise all yellow.

♂-*Genitalia:* aedeagus as illustrated by Spencer, 1961c: fig. 20, conspicuous gap between mesophallus and basiphallus.

♂-Holotype: ETHIOPIA: Addis Ababa, Little Akaki River, 9.XI.1959, E. M. Hering; in author's collection.

Genus *PSEUDONAPOMYZA* Hendel, 1920

As a result of further collecting in South Africa and Rhodesia in January-February, 1964 I have been able to clarify the African species in this genus. It can now be seen that there are two groups, one feeding on Gramineae and the other on Acanthaceae.

Two new species bred from leaf-mines on Acanthaceae and a further species which is certainly a Gramineae-feeder are described below. Twelve species are now known in Africa. Of these three belong to the *spicata*-group (Gramineae), six to the *hypoestis*-group (Acanthaceae), while the position of three — *lucentis* Spencer, *nigralis* Spencer, and *perspicua* Spencer — remains to be established.

Pseudonapomyza acanthacearum (Spencer), 1959, figs. 60 and 61, **comb. nov.**

Phytagromyza acanthacearum Spencer, 1959: 313.

NATAL: Zululand, Ingwavuma, 10.XII.1963, one ♂, B. and P. Stuckenberg.

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The aedeagus of this specimen is shown in figs. 60 and 61. It agrees closely with that of the holotype from Cameroons which I have recently re-examined.

Pseudonapomyza asystasiae spec. nov., figs. 62-64

Closely resembling *P. matopi* described below, with following points of difference:

Adult: arista more pubescent; second dorsocentral longer, intermediate between first and third; larger, wing length 2.1 mm, second costal segment longer, three times length of fourth, second cross-vein almost in continuation of first; squamae darker, grey.

♂*-Genitalia:* aedeagus as in figs. 62 and 63, distiphallus with distinctive black areas.

Puparium: posterior spiracles with bulbs conspicuously more elongated (fig. 64), one being distinctly longer than the other two.

Leaf-mine: irregularly linear, sometimes almost blotch-like, frass conspicuous, very irregular, either in long, connected threads or more broken; pupation externally.

♂-Holotype: NATAL: Gillitts, 2.III.1964, ex leaf-mine on Asystasia gangetica T. Anders (det. Gillett, Royal Botanic Gardens, Kew), found 30.I.1964; one ♂-paratype emerged 3.III.1964, otherwise same data, both in author's collection.

Empty leaf-mines of this species were also found by the author on the same host-plant at Umhlanga Rocks, nr. Durban, 8.XII.1961, and at Victoria Falls (Rhodesia), 2.I.1964. It is now clear that the mines found on the same host-plant at Dakar (Spencer, 1959: 312) were of a *Pseudonapomyza* species, not a *Liriomyza* species. It is possible that the species concerned is also *P. asystasiae* but on the slides of dead larvae prepared by Prof. Hering no trace can be found of the distinctive papilli which are very apparent in the puparia of the types from Natal; the posterior spiracles, however, are very similar. Confirmation of the species from Dakar will only be possible after examination of ♂-genitalia of reared adults.

This species together with *P. matopi* described below can be included in the following extension of the author's key to African *Pseudonapomyza* species, as amended (1964a: 120):

4a	Wing base and margins of mesopleura distinctly yellowish	4b
—	Wing base and pleura entirely black	4c
4b	Squamal fringe ochrous	**acanthacearum** (Spencer)
—	Squamal fringe black	**urundensis** (Spencer)
4c	Second costal segment at most twice length of fourth	4d
—	Second costal segment three times length of fourth	**asystasiae**
4d	Second costal segment twice length of fourth; distiphallus pale (figs. 73 74) . . .	**matopi**
—	Second costal segment shorter, at most 1½ times length of fourth; distiphallus black (Spencer, 1963a: fig. 27).	**perspicua** Spencer

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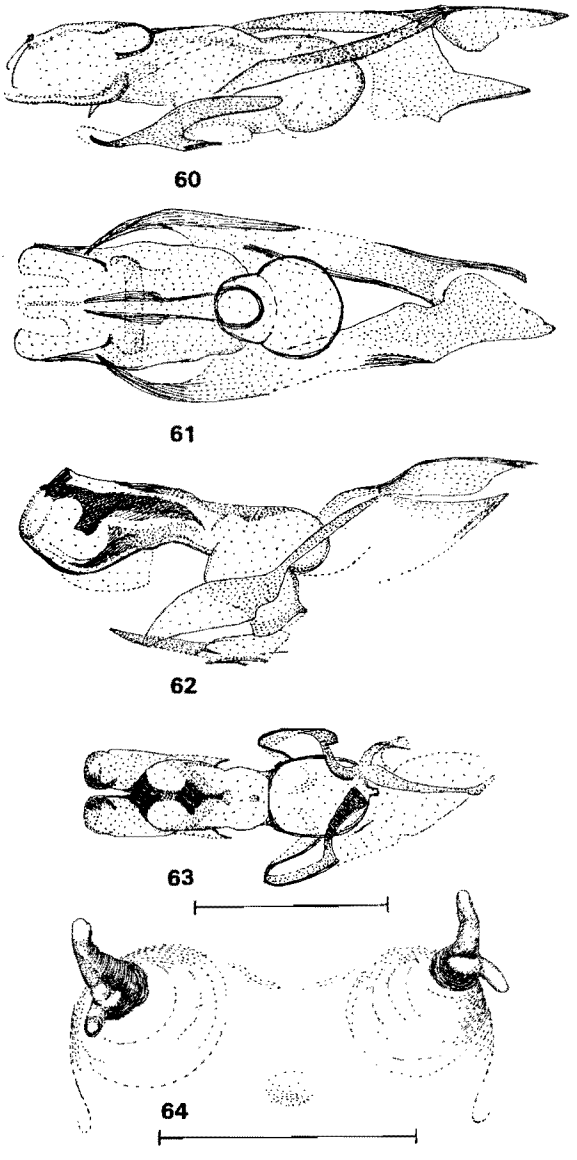

Figs. 60-61. *Pseudonapomyza acanthacearum:* 60, aedeagus, side view; 61, same, ventral view.

Figs. 62-64. *Ps. asystasiae:* 62, aedeagus, side view; 63, same, ventral view; 64, posterior spiracles of puparium.

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Pseudonapomyza hohmanni spec. nov., figs. 65-68

Head: frons narrow, slightly less than width of eye, orbits well-differentiated but narrow and not raised above eye; two *ors*, the upper slightly longer, two slender *ori*, orbital setulae very sparse, reclinate; jowls deeply extended at rear, cheeks forming broad ring below eye; third antennal segment (fig. 65) with conspicuous angle at upper corner. *Mesonotum:* 3 + 0 dorsocentrals, second only slightly shorter than first, third two-thirds length of second; *acr* in four rows in front, ending midway between second and first *dc*. *Wing:* length 1.35 mm, exactly as in atra Mg. (cf. Hendel, 1931-6: fig. 309). *Colour:* frons mat brownish-black, orbits and cheeks brilliantly shining black; mesonotum slightly greyish-black, partially mat but with some sub-shine; legs entirely black; squama, fringe and halteres white.

♂-*Genitalia:* aedeagus in side view as fig. 66, distiphallus in dorsal view as in fig. 67, ninth sternite and postgonites as in fig. 68.

♂-Holotype: NATAL: Gillitts, 11.V.1962, B. and P. Stuckenberg; in coll. Natal Nuseum; ♂-paratype, S. W. Africa, Okahandja, nr. Windhoek, 27.I-2.II. 1928, R. E. Turner, in coll. British Museum (Nat. Hist.).

This species is named in honour of Mr H. Hohmann of Banhoek Valley, Stellenbosch, who has given me valuable assistance on my collecting expeditions in South Africa. It is readily distinguishable from both *asiatica* Spencer and *spicata* (Malloch) by the shining black orbits and cheeks and also by the entirely different genitalia. The aedeagus suggests a closer relationship with the European species *atra* (Mg.).

P. hohmanni can be included in the author's key to Ethiopian *Pseudonapomyza* species as previously amended (Spencer, 1961c: 426) by the following extension to couplet 2:

Couplet 2, second alternative, for *asiatica* Spencer, read 2a; add new couplet:

2a Orbits and cheeks greyish . . . . . **asiatica** Spencer
— Orbits and cheeks brilliantly shining black; aedeagus as in figs. 66, 67 . . . . **hohmanni**

Pseudonapomyza hypoestis Hering, 1957, figs. 69-71

NATAL: Pietermaritzburg, Town Bush, 25.II.1964, two ♂♂, ex leaf-mines on Hypoestis?verticillaris.

The aedeagus of this species is shown in figs. 69 and 70. The spiracular processes of the puparium (fig. 71) are widely separated, each with three black, well-formed spiracles.

Pseudonapomyza hypoestivora (Séguy), 1951, fig. 72

RHODESIA: Matopos Hills, 6.III.1964, two ♀♀, ex leaf-mines on Hypoestis species.

The spiracular processes of the puparium are shown in fig. 72.

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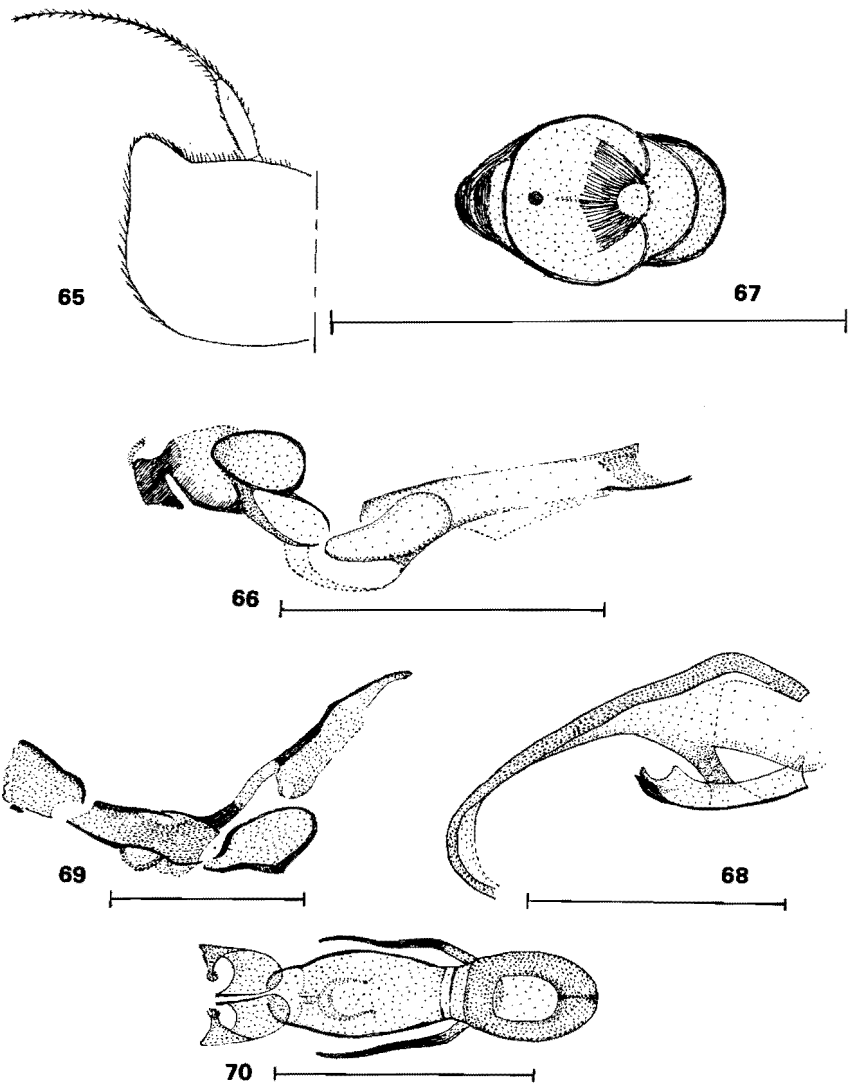

Figs. 65-68. *Pseudonapomyza hohmanni:* 65, third antennal segment; 66, aedeagus, side view; 67, distiphallus, dorsal view; 68, ninth sternite and postgonite.

Figs. 69-70. *Ps. hypoestis:* 69, aedeagus, side view; 70, aedeagus, ventral view (without basiphallus).

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Pseudonapomyza matopi spec. nov., figs. 73-76

Head: frons narrow, equal to width of eye; orbital bristles stout, two *ors*, the upper slightly longer, two somewhat weaker *ori*; orbital setulae sparse, largely upright, more reclinate at rear; ocellar triangle not greatly differentiated, apex not extending beyond upper *ors*; lunule small, narrow, higher than a semicircle; jowls angular, narrow in front but deeply extended at rear; third antennal segment round, with distinct whitish pubescence, arista largely bare, long. *Mesonotum:* three dorso-centrals, third only slightly shorter than second, first substantially longer than second; *acr* regular, in eight rows, decreasing beyond second *dc*. *Wing:* length 1.6 mm, as in fig. 73; second costal segment twice length of fourth; second cross-vein slightly basad of first, discal cell not fully closed. *Legs:* mid-tibiae with two distinct lateral bristles. *Colour:* frons mat black, orbits very weakly shining; mesonotum and abdomen shining black; legs and pleura entirely black; wing base at most somewhat brownish; squamae white, margin and fringe black.

♂-*Genitalia:* aedeagus as in figs. 74 and 75, surstyli not differentiated as normal in genus.

Puparium: minute papilli characteristic of the genus running around centre of the segments; posterior spiracles minute, on distinct stalks, each with three bulbs, as in fig. 76.

Leaf-mine: upper surface, initially linear with conspicuous strips of black frass at alternate sides of the channel, later developing into a blotch, with frass scattered irregularly; pupation externally.

♂-Holotype: RHODESIA: Matopos Hills, nr. Bulawayo, 29.II.1964, ex leaf-mine on host-plant identified by H. Wild, Branch of Botany, Salisbury, as probably Dicliptera monroi T. Moore (Acanthaceae), found 1.II.1964, K.A.S.; in author's collection, one ♂-paratype, same data, in poor condition.

This species can be included in the author's (1959) key to African *Pseudonapomyza* species in the extension to couplet 4 given on p. 265.

Pseudonapomyza spicata (Malloch), 1914.

RHODESIA: Matopos Hills, 1.II.1964, leaf-mine with larva feeding on Andropogon gayanus Kunth, var. squamulatus (Hochst.) Hack.; Victoria Falls, 3.II.1964, leaf-mine on same host-plant (K.A.S.).

No adults were reared but the puparia bear the short, distinctive papilli exactly as in *spicata* (cf. Spencer, 1961a: fig. 36) and there seems little doubt that this is the species concerned.

Pseudonapomyza urundensis (Spencer), 1959, fig. 77

The spiracular arrangement of the puparium of the specimens bred at Addis Ababa from blotch-mines on Hypoestes triflora (Vahl) Roem. & Schult. (Spencer, 1961c: 428) is shown in fig. 77.

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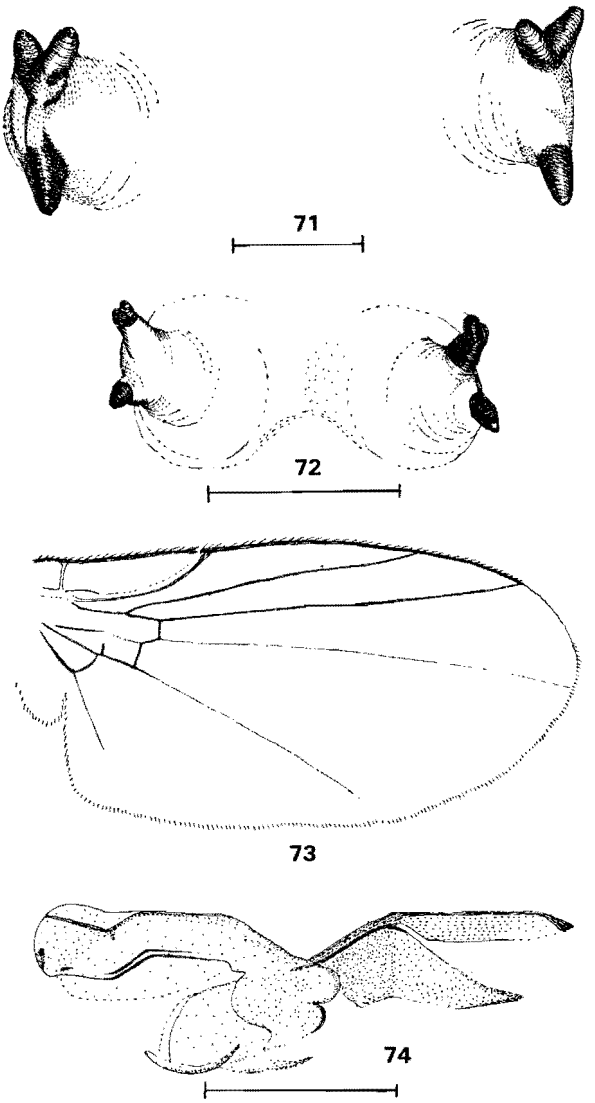

Fig. 71. *Pseudonapomyza hypoestis:* posterior spiracles of puparium.
Fig. 72. *Ps. hypoestivora:* posterior spiracles of puparium.
Figs. 73-74. *Ps. matopi:* 73, wing; 74, aedeagus, side view.

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Similar empty blotch-mines on Justicia calaphanoides found by the author thor at Gillitts (Natal), 30.I.1964 and at Bulawayo (Rhodesia), 31.I.1964 appear to be referable to this species.

Genus *NAPOMYZA* Haliday, 1840

A striking new species is described below and a new key is given for the four species now known in Africa, as follows:

1 Second cross-vein distinctly distad of first; humerus yellow . **drakensbergensis** Spencer
— Second cross-vein in continuation of first; humerus grey or black. 2
2 Mesonotum black, moderately shining; eye small, slanting . . . . . **strana** Spencer
— Mesonotum grey, entirely mat; eye large, upright 3
3 Squamal fringe pale; jowls half eye height; small species, wing length in female 2.2 mm . . . . . **munroi** Spencer
— Squamal fringe black; jowls two-thirds eye height; large species, wing length in male 3.1 mm . . . . . **vivida**

Napomyza munroi Spencer, 1960.

CAPE PROVINCE: Barkly East Distr., Naudes Nek, 2350-2525 m, 19.I.1963, two ♀♀; BASUTOLAND: Maseru Distr., Maloti Mts., Bushman's Pass, 2125-2250 m, 8-14.I.1963, one ♀, B. and P. Stuckenberg.

The only previous record is of the holotype from Grahamstown.

Napomyza vivida spec. nov., figs. 78 and 79

Head: frons exceptionally broad, slightly more than twice width of eye, distinctly projecting above eye, more so anteriorly; four equal orbital bristles, the two *ors* reclinate, the two *ori* incurved; orbital setulae short, in several rows, all proclinate; jowls deeply extended at rear, one half vertical height of eye, cheeks about half depth of jowls; third antennal segment longer than broad, lower margin curving upwards, upper margin more straight, arista strong, slightly pubescent. *Mesonotum:* acrostichals largely regular, in two rows; a single line of hairs in the intra-alar area. *Wing:* length 3.1 mm, costal segments 2, 3, 4 in ratio 32:12:30, second cross-vein in continuation of first. *Legs:* mid-tibia without lateral bristles. *Colour:* frons, lunule, jowls orange-yellow, face largely similar, only slightly greyish; orbits slightly paler yellowish, narrowly black adjoining eye margin at level of upper *ors;* both *vti* and *vte* on black ground, *vti* at border of yellow; second and third antennal segments black, first slightly yellowish; mesonotum mat grey; pleura black, dusted with grey, apart from upper and hind margins of mesopleura and a spot on lower corner of humerus which are bright orange-yellow; wing base, knees, hind margins of tergites, halteres also conspicuously orange; squamae whitish-grey, margin black.

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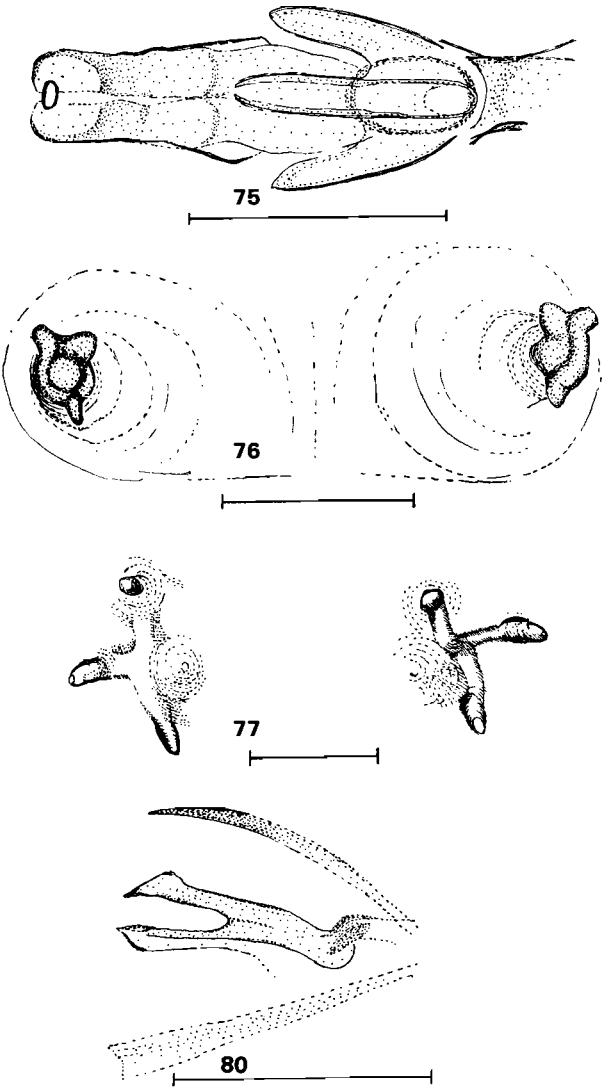

Figs. 75-76. *Pseudonapomyza matopi:* 75, aedeagus, ventral view; 76, posterior spiracles of puparium.

Fig. 77. *Ps. urundensis:* posterior spiracles of puparium.

Fig. 80. *Phytomyza philoclematidis:* distiphallus.

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♂-*Genitalia:* aedeagus as in figs. 78 and 79; postgonites large, ending in two distinct black teeth; ninth sternite short, arms broad; spermal sac black, very small.

♂-Holotype: BASUTOLAND: Maseru Distr., Maloti Mts., Bushman's Pass, 2125-2250 m, 8-14.1963, B. and P. Stuckenberg; in Natal Museum.

Genus *PHYTOMYZA* Fallén, 1810

Phytomyza philoclematidis Hering, 1957, fig. 80

NATAL: Drakensberg, Giants Castle Reserve, 1800 m, 18-23.IX.1963, one ♂, two ♀♀; Royal Natal National Park, 1500 m, 12.IX.1963, one ♂, all B. and P. Stuckenberg.

This is the only confirmed record of this species apart from the types from Pretoria. The aedeagus was illustrated by Spencer (1963a: fig. 29). Examination of this further material shows that the extended tubule of the distiphallus becomes virtually invisible distally where it is terminated by two short black processes. The aedeagus is shown in ventral view in fig. 80.

Phytomyza seneciovora Spencer, 1959, figs. 81 and 82

The genitalia of the specimen from Tanganyika (Spencer, 1960c: 324) have been examined and the aedeagus is shown in figs. 81 and 82. This agrees closely with that of the holotype from Cameroons (Spencer, 1961c: fig. 24).

Leaf-mines of unidentified species

1. Acalypha psilostachya Hochst. ex A. Rich. (Euphorbiaceae), fig. 83. Rhodesia: Victoria Falls, Palm Grove, 1.II.1964, larvae feeding but no adults obtained; *Agromyza* species.
2. Agrostis semiverticillata (Forsk.) Christ. (Gramineae). Cape Province: Banhoek Valley, nr. Stellenbosch, 23.I.1964, empty. Probably *Liriomyza* species.
3. Briza minor L. (Gramineae). As above.
4. Bromus unioloides H.B.K. (Gramineae). As above.
5. Clematis brachiata Thbg. (Ranunculaceae).
   Rhodesia: Matopos Hills, 1.II.1964, empty; *Phytomyza* species.
6. Cyperus albostriatus Schrad. (Cyperaceae).
   Natal: Pietermaritzburg, Town Bush, 29.I.1964, empty.
   Probably *Cerodontha* (*Dizygomyza*) species.

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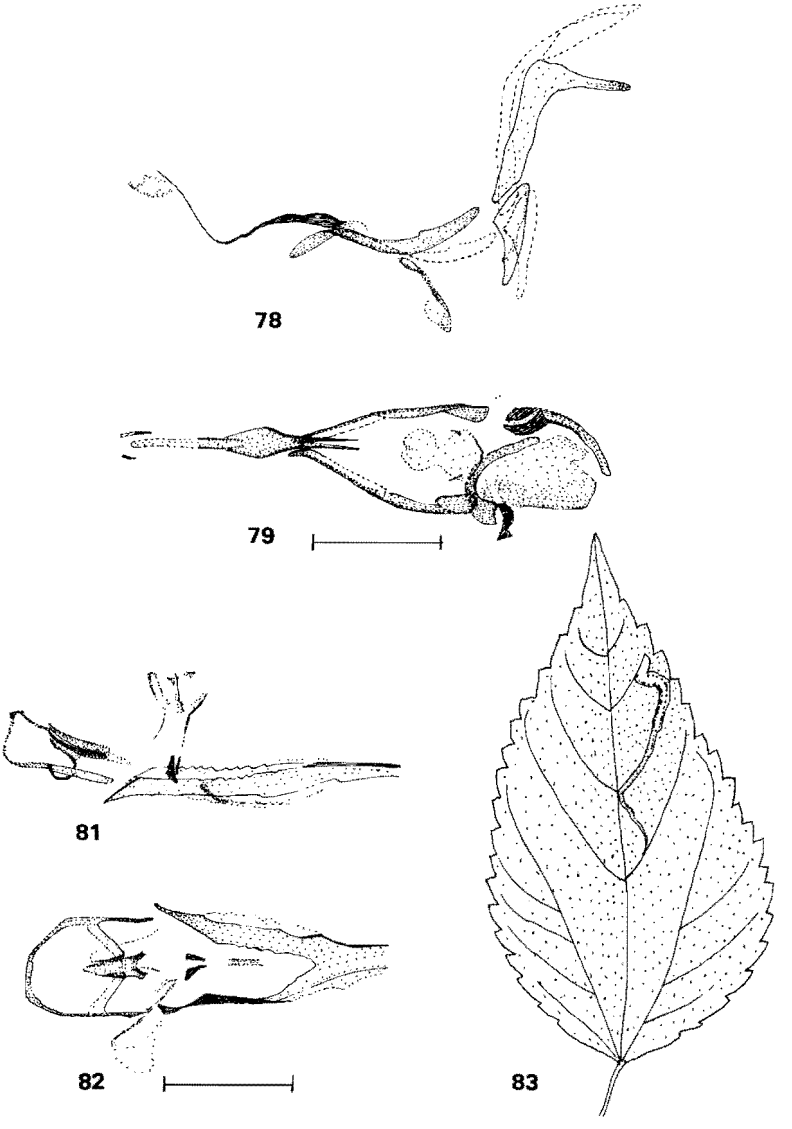

Figs. 78-79. *Napomyza vivida:* 78, aedeagus, side view, 79, same, ventral view.
Figs. 81-82. *Phytomyza seneciovora:* 81, aedeagus, side view; 82, same, ventral view.
Fig. 83. Leaf-mine of *Agromyza* species on Acalypha psilostacha.

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7. Lippia javanica (Burm. f.) Spreng. (Verbenaceae).
Natal: Nagle Dam, 29.I.1964, empty; a small brownish blotch, linear at first, at leaf-margin.

8. Panicum maximum Jacq, (Gramineae).
Rhodesia: Victoria Falls, 1.II.1964, empty; a greenish-white blotch, almost certainly *Agromyza* species.

9. Plectranthus laxiflorus Benth. (Labiatae).
Natal: Pietermaritzburg, Town Bush, 29.I.1964, empty; a narrow, winding, upper surface channel, similar tot hat of *Ophiomyia colei* Spencer (cf. p. 237) on Coleus species. Possibly the same species.

10. Setaria verticillata (L.) Beauv. (Gramineae).
Rhodesia: Bulawayo, 31.I.1964, larvae feeding but all died; a long whitish mine, certainly *Agromyza* species.

11. Smilax species (Liliaceae).
Natal: Gillitts, 30.I.1964; a whitish epidermal mine, pupation in leaf. Similar mines on Smilax have been found in India (Spencer, 1961a: 76) and Australia (1963c: 314). The species is a *Melanagromyza* species, s.lat., but has not yet been reared.

12. Sporabolus filipes Stapf (Gramineae).
Kenya: Nairobi, Game Park, 3.II.1964. Similar to No. 8 above.

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